TVET CURRICULUM DEVELOPMENT, ASSESSMENT AND CERTIFICATION COUNCIL (TVET CDACC)

NATIONAL OCCUPATIONAL STANDARDS

FOR

ICT TECHNICIAN

LEVEL 5

TVET CDACC
P.O BOX 15745-00100
NAIROBI

First published 2018

Council Secretary/CEO
TVET Curriculum Development, Assessment and Certification Council
P.O. Box 15745–00100 Nairobi, Kenya
Email: cdacc.tvet@gmail.com

FOREWORD

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

Reforms in the education sector are necessary for the achievement of Kenya Vision 2030 and meeting the provisions of the Constitution of Kenya 2010. The education sector had to be aligned to the Constitution and this resulted to the formulation of the Policy Framework for Reforming Education and Training (Sessional Paper No. 4 of 2016). A key feature of this policy is the radical change in the design and delivery of the TVET training. This policy document requires that training in TVET be competency based, curriculum development be industry led, certification be based on demonstration of competence and mode of delivery allows for multiple entry and exit in TVET programmes.

These reforms demand that Industry takes a leading role in curriculum development to ensure the curriculum addresses its competence needs. It is against this background that these Occupational Standards were developed for the purpose of developing a competency-based curriculum for ICT Technician Level 5. 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 Technology sector's growth and sustainable development.

PRINCIPAL SECRETARY, VOCATIONAL AND TECHNICAL TRAINING
MINISTRY OF EDUCATION

PREFACE

The TVET Curriculum Development, Assessment and Certification Council (TVET CDACC), in conjunction with ICT Sector Skills Advisory Committee (SSAC) have developed these Occupational Standards for an ICT Technician. These standards will be the bases for development of a competency-based curriculum for ICT Technician Level 5. These Standards will also be the bases for assessment of an individual for competence certification.

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

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

Prof. CHARLES M. M. ONDIEKI, PhD, FIET (K), Con. Eng. Tech.
CHAIRMAN, TVET CDACC

ACKNOWLEDGMENT

These Occupational Standards were developed through combined effort of various stakeholders from private and public organizations. I am sincerely thankful to the management of these organizations for allowing their staff to participate in this course. I wish to acknowledge the invaluable contribution of industry players who provided inputs towards the development of these Standards.

I thank TVET Curriculum Development, Assessment and Certification Council (TVET CDACC) for providing guidance on the development of these Standards. My gratitude goes to the ICT 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.

CHAIRMAN ICT SECTOR SKILLS ADVISORY COMMITTEE

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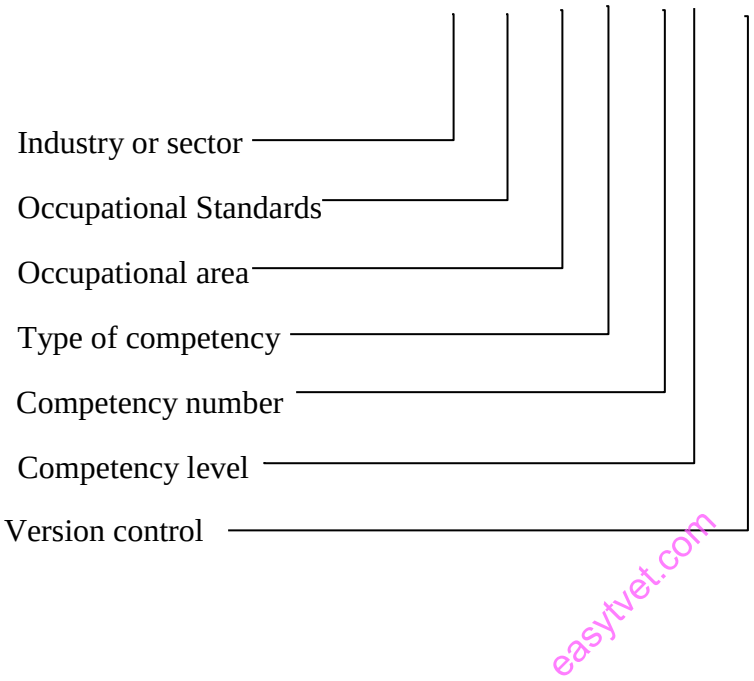
ACRONYMS

ICT	Information Communication Technology
CDACC	Curriculum Development, Assessment and Certification Council
TVET	Technical and Vocational Education and Training
TVET	Technical and Vocational Education and Training
KCSE	Kenya Certificate of Secondary Education
PPE	Personal Protective Equipment
KNQA	Kenya National Qualification Authority
KNQF	Kenya National Qualification Framework
PPE	Personal protective equipment
TVET	Technical and Vocational Education and Training
ISP	Information security policy
CAD	Computer Aided Design
ICT	Information Communication Technology
CCTV	Closed Circuit Television
WAN	Wide Area Network
LAN	Local Area Network
MIS	Management Information System
SDLC	System Development life cycle
IS	Information system
DTP	Desktop Publishing
POST	Power on Self-Test
HTTP	Hypertext Transfer Protocol
OSH	Occupational Health and Safety
EMS	Environmental Management Systems
RAM	Random Access Memory
DMA	Direct Memory Access
FIFO	First In First Out
SSFT	Shortest Seek Time First
LAN	Large Area Network

WAN	Wide Area Network
PAN	Personal Area Network
TPS	Transaction Processing System
OIS	Operation Information System
DSS	Decision Support System
ERP	Enterprise Resource Planning

KEY TO UNIT CODE

IT/OS/ICT/BC/01/5 A



COURSE OVERVIEW

ICT Technician Level 5 qualification consists of competencies that a person must achieve to enable him/her to be certified as an ICT technician.
ICT Technician is a person who can demonstrate underpinning knowledge and competence in Supporting or enabling the use of ICT equipment and applications, selecting appropriate ICT resources, techniques, configurations, procedures and methods, Installing, operating, and maintaining ICT systems.

Therefore, an ICT technician is a well-trained person who can carry out these responsibilities. These responsibilities comprise the units of competency of an ICT Technician certificate level 5 which include the following basic and core competencies:

BASIC COMPETENCIES

1. Demonstrate communication skills
2. Demonstrate Numeracy Skills
3. Demonstrate digital literacy
4. Demonstrate entrepreneurial skills
5. Demonstrate employability skills
6. Demonstrate environmental literacy
7. Demonstrate occupational safety and health practices

CORE COMPETENCIES

1. Perform Computer Networking
2. Install Computer software
3. Perform Computer Repair and Maintenance
4. Manage Database System
5. Develop Computer Program
6. Manage Operating System

BASIC UNITS OF COMPETENCY

DEMONSTRATE COMMUNICATION SKILLS

UNIT CODE: IT/OS/ICT/BC/1/5

UNIT DESCRIPTION

This unit covers the competencies required to use specialized communication skills to meet specific needs of internal and external clients, conduct interviews, facilitate discussion with groups and contribute to the development of communication strategies.

ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT These describe the key outcomes which make up workplace function	**PERFORMANCE CRITERIA** These are assessable statements which specify the required level of performance for each of the elements. ***Bold and italicized terms are elaborated in the Range***
1. Meet communication needs of clients and colleagues	1 .1Specific communication needs of clients and colleagues are identified and met 1 .2 Different approaches are used to meet communication needs of clients and colleagues 1 .3 Conflict is addressed promptly and in a timely way and in a manner which does not compromise the standing of the organization
2. Contribute to the development of communication strategies	2.1 Strategies for internal and external dissemination of information are developed, promoted, implemented and reviewed as required 2.2 Channels of communication are established and reviewed regularly 2.3 Coaching ineffective communication is provided 2.4 Work related network and relationship are maintained as necessary 2.5 Negotiation and conflict resolution strategies are used where required 2.6 Communication with clients and colleagues is appropriate to individual needs and organizational objectives
3. Conduct interviews	3.1 A range of appropriate communication strategies are employed in ***interview situations*** 3.2 Records of interviews are made and maintained in accordance with organizational procedures 3.3 Effective questioning, listening and nonverbal communication techniques are used to ensure that required message is communicated
4. Facilitate group discussions	4.1 Mechanisms which enhance effective group interaction is defined and implemented

	4.2 Strategies which encourage all group members to participate are used routinely 4.3 Objectives and agenda for meetings and discussions are routinely set and followed 4.4 Relevant information is provided to group to facilitate outcomes 4.5 Evaluation of group communication strategies is undertaken to promote participation of all parties 4.6 Specific communication needs of individuals are identified and addressed
5. Represent the organization	5.1 When participating in internal or external forums, presentation is relevant, appropriately researched and presented in a manner to promote the organization 5.2 Presentation is clear and sequential and delivered within a predetermined time 5.3 Utilize appropriate media to enhance presentation 5.4 Differences in views are respected 5.5 Written communication is consistent with organizational standards 5.6 Inquiries are responded in a manner consistent with organizational standard

RANGE

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

Variable	Range
Communication strategies include but not limited to:	• Language switch • Comprehension check • Repetition • Asking confirmation • Paraphrase • Clarification request • Translation • Restructuring • Approximation • Generalization
Effective group interaction includes but not limited to:	• Identifying and evaluating what is occurring within an interaction in a non-judgmental way • Using active listening • Making decision about appropriate words, behavior

	• Putting together response which is culturally appropriate • Expressing an individual perspective • Expressing own philosophy, ideology and background and exploring impact with relevance to communication • Openness and flexibility in communication
Situations include but not limited to:	• Establishing rapport • Eliciting facts and information • Facilitating resolution of issues • Developing action plans • Diffusing potentially difficult situations

REQUIRED SKILLS AND KNOWLEDGE

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

Required Skills

The individual needs to demonstrate the following skills:

- Effective communication process
- Active listening
- Giving/receiving feedback
- Interpretation of information
- Role boundaries setting
- Negotiation
- Establishing empathy
- Openness and flexibility in communication
- Communication skills required to fulfill job roles as specified by the organization

Required Knowledge

The individual needs to demonstrate knowledge of:

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

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 Met communication needs of clients and colleagues 1.2 Contributed to the development of communication strategies

	1.3 Conducted interviews 1.4 Facilitated group discussions 1.5 Represented the organization
2. Resource Implications	2.1 The following resources should be provided: 2.2 Access to relevant workplace or appropriately simulated environment where assessment can take place 2.3 Materials relevant to the proposed activity or tasks
3. Methods of Assessment	Competency in this unit may be assessed through: 3.1 Direct Observation/Demonstration with Oral Questioning 3.2 Written Examination
4. Context of Assessment	4.1 Competency may be assessed individually in the actual workplace or through accredited institution
5. Guidance information for assessment	5.1 Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

DEMONSTRATE NUMERACY SKILLS

UNIT CODE: IT/OS/ICT/BC/2/5

UNIT DESCRIPTION

This unit covers the competencies required to perform numerical functions. The person who is competent in this unit shall be able to: Calculate with whole numbers and familiar fractions, decimals and percentages for work; Estimate, measure, and calculate with routine metric measurements for work; Use routine maps and plans for work; Interpret, draw and construct 2D and 3D shapes for work; Interpret routine tables, graphs and charts for work; Collect data and construct routine tables and graphs for work; and Use basic functions of calculator

ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT These describe the key outcomes which make up workplace function.	**PERFORMANCE CRITERIA** These are assessable statements which specify the required level of performance for each of the elements. ***Bold and italicized terms are elaborated in the Range.***
1. Calculate with whole numbers and familiar fractions, decimals and percentages for work	1.1 Mathematical information that may be partly embedded in routine workplace tasks and texts is selected and interpreted 1.2 Whole numbers and routine or familiar fractions, decimals and percentages including familiar rates are interpreted and comprehended 1.3 Calculations which may involve a number of steps are perform 1.4 Calculations done with whole numbers and routine or familiar fractions, decimals and percentages 1.5 Conversion between equivalent forms of fractions, decimals and percentages is done 1.6 Order of operations is applied to solve multi-step calculations 1.7 Problem solving strategies are appropriately applied 1.8 Estimations are made to check reasonableness of problem solving process, outcome and its appropriateness to the context and task 1.9 Formal and informal mathematical language and symbolism are used to communicate the result of the task
2. Estimate, measure, and calculate with routine metric measurements for work	2.1 Measurement information in workplace tasks and texts are selected and interpreted in accordance with workplace requirements 2.2 Appropriate routine measuring equipment are identified and selected in accordance with workplace requirements 2.3 Measurements are estimated and made using correct units

	2.4 Estimations and calculations done using routine measurements 2.5 Conversions performed between routinely used metric units 2.6 Problem solving processes are used to undertake the tasks 2.7 Estimations are made to check reasonableness of problem solving process, outcome and its appropriateness to the context and task 2.8 Information is recorded using mathematical language and symbols appropriate to discuss the task
3. Use routine maps and plans for work	3.1 Features are identified in routine maps and plans 3.2 Symbols and keys in routine maps and plans are clearly explained 3.3 Orientation of map to North is identified and interpreted 3.4 Understanding of direction and location is clearly demonstrated 3.5 Simple scale is applied to estimate length of objects, or distance to location or object 3.6 Directions are given and received using both formal and informal language
4. Interpret, draw and construct 2D and 3D shapes for work	4.1 Two dimensional shapes and routine three dimensional shapes identified in everyday objects and in different orientations 4.2 The use and application of shapes elaborately explained 4.3 Formal and informal mathematical language and symbols used to describe and compare the features of two dimensional shapes and routine three dimensional shapes 4.4 Common angles identified 4.5 Common angles in everyday objects are appropriately estimated 4.6 Formal and informal mathematical language are used to describe and compare common angles 4.7 Common geometric instruments used to draw two dimensional shapes 4.8 Routine three dimensional objects constructed from given nets
5. Interpret routine tables, graphs and charts for work	5.1 Routine tables, graphs and charts identified in predominately familiar texts and contexts 5.2 common types of graphs and their different uses identified 5.3 features of tables, graphs and charts identified 5.4 Information in routine tables, graphs and charts located and interpreted 5.5 Calculations are perform to interpret information

	5.6 How statistics can inform and persuade interpretations is explained 5.7 misleading statistical information is identified 5.8 Information relevant to the workplace is discussed
6. Collect data and construct routine tables and graphs for work	6.1 Features of common tables and graphs identified 6.2 uses of **different tables and graphs** identified 6.3 Data and variables to be collected are determined 6.4 The audience is determined 6.5 Method of data collection is select 6.6 Data is collected 6.7 Information is collated in a table 6.8 Suitable scale and axes determined 6.9 Graph to present information is drafted and drawn 6.10 Data checked to ensure that it meets the expected results and context 6.11 Information is reported or discussed using formal and informal mathematical language
7. Use basic functions of calculator	7.1 Keys are identified and used for **basic functions on a calculator** 7.2 Calculation done using whole numbers, money and routine decimals and percentages 7.3 Calculation done with routine fractions and percentages 7.4 Order of operations is applied to solve multi-step calculations 7.5 Results are interpreted, displayed and recorded 7.6 Estimations are made to check reasonableness of problem solving process, outcome and its appropriateness to the context and task 7.7 Formal and informal mathematical language and appropriate symbolism and conventions used to communicate the result of the task

RANGE

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

Variable	**Range**
1. Simple fractions, decimals and percentages	May include but not limited to: 1.1 Fraction 1.2 Decimals 1.3 Percentages

2. Common 2D shapes and common 3D shapes	May include but not limited to: 2.1 Round 2.2 Square 2.3 Rectangular 2.4 Triangle 2.5 Sphere 2.6 Cylinder 2.7 Cube 2.8 Polygons 2.9 Cuboids
3. Symbols and keys in routine maps and plans	May include but not limited to: 3.1 Charts 3.2 Maps 3.3 Graphs
4. Use basic functions of calculator	May include but not limited to: 4.1 Addition 4.2 Multiplication 4.3 Calculate ratios 4.4 Conversion of ratios into percentages
5. Routine tables, graphs and charts for work	May include but not limited to: 5.1 Bar Graphs 5.2 Flow Charts 5.3 Pie Charts 5.4 Pictograph 5.5 Line Graphs 5.6 Time Series Graphs 5.7 Stem and Leaf Plot 5.8 Histogram 5.9 Dot Plot 5.10 Scatter plot

REQUIRED SKILLS AND KNOWLEDGE

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

Required Skills

The individual needs to demonstrate the following skills:

- Applying Fundamental operations (addition, subtraction, division, multiplication)
- Using calculator
- Using different measuring tools

Required knowledge

The individual needs to demonstrate knowledge of:

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

EVIDENCE GUIDE

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

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Calculated correctly with whole numbers and routine or familiar fractions, decimals and percentages 1.2 Estimated, measured and calculated with routine metric measurements 1.3 Applied simple scale to estimate length of objects or distance to location or object 1.4 Used formal and informal mathematical language to describe and compare common angles 1.5 Used common geometric instruments to draw two dimensional shapes 1.6 Collected data and constructed routine tables and graphs 1.7 Used basic functions of calculator correctly
2. Resource Implications	2.1 Calculator 2.2 Basic measuring instruments
3. Methods of Assessment	Competency may be assessed through: 3.1 Written Test 3.2 Interview/Oral Questioning 3.3 Demonstration
4. Context of Assessment	4.1 Competency may be assessed in an off the job setting
5. Guidance information for assessment	5.1 Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

DEMONSTRATE DIGITAL LITERACY

UNIT CODE:IT/OS/ICT/BC/3/5

UNIT DESCRIPTION

This unit covers the competencies required to effectively use digital devices such as smartphones, tablets, laptops and desktop PCs. It entails identifying and using digital devices such as smartphones, tablets, laptops and desktop computers for purposes of communication, work performance and management at the work place.

ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT These describe the key outcomes which make up workplace function	**PERFORMANCE CRITERIA** These are assessable statements which specify the required level of performance for each of the elements. ***Bold and italicized terms are elaborated in the Range***
1. Identify appropriate computer software and hardware	1.1 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 ***Data security and privacy are classified*** in accordance with the prevailing technology 2.2 ***Security threats*** are identified, **and** ***control measures*** are applied in accordance with laws governing protection of ICT 2.3 Computer threats and crimes are detected. 2.4 Protection against computer crimes is undertaken in accordance with laws governing protection of ICT
3. Apply computer software in solving tasks	3.1 ***Word processing concepts*** are applied in resolving workplace tasks, report writing and documentation 3.2 ***Word processing utilities*** are applied in accordance with workplace procedures 3.3 Worksheet layout is prepared in accordance with work procedures 3.4 Worksheet is build and data manipulated in the worksheet in accordance with workplace procedures

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

RANGE

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

Variable	**Range**
1. Appropriate computer software may include but not limited to:	1.1 A collection of instructions or computer tools that enable the user to interact with a *computer*, its hardware, or perform tasks.
2. Appropriate computer hardware may include but not limited to:	Collection of physical parts of a computer system such as; 2.1 Computer case, monitor, keyboard, and mouse 2.2 All the parts inside the computer case, such as the hard disk drive, motherboard and video card

3. Data security and privacy may include but not limited to:	3.1 Confidentiality of data 3.2 Cloud computing 3.3 Integrity -but-curious data surfing
4. . Security and control measures may include but not limited to:	4.1 Counter measures against cyber terrorism 4.2 Risk reduction 4.3 Cyber threat issues 4.4 Risk management 4.5 Pass wording
5. Security threats may include but not limited to:	5.1 Cyber terrorism 5.2 Hacking
6. Word processing concepts may include but not limited to:	6.1 Using a special program to create, edit and print documents
7. Network configuration may include but not limited to:	7.1 Organizing and maintaining information on the components of a computer network

REQUIRED SKILLS AND KNOWLEDGE

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

Required Skills

The individual needs to demonstrate the following skills:

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

Required Knowledge

The individual needs to demonstrate knowledge of:

- Software concept
- Functions of computer software and hardware
- Data security and privacy
- Computer security threats and control measures
- Technology underlying cyber-attacks and networks
- Cyber terrorism
- Computer crimes

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

EVIDENCE GUIDE

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

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1 Identified and controlled security threats 1.2 Detected and protected computer crimes 1.3 Applied word processing in office tasks 1.4 Designed, prepared work sheet and applied data to the cells in accordance to workplace procedures 1.5 Opened electronic mail for office communication as per workplace procedure

	1.6 Installed internet and World Wide Web for office tasks in accordance with office procedures 1.7 Integrated emerging issues in computer ICT applications 1.8 Applied laws governing protection of ICT
2. Resource Implications	2.1 Tablets 2.2 Laptops 2.3 Desktop computers 2.4 Calculators 2.5 Internet 2.6 Smart phones 2.7 Operation Manuals
3. Methods of Assessment	Competency may be assessed through: 3.1 Written Test 3.2 Demonstration 3.3 Practical assignment 3.4 Interview/Oral Questioning 3.5 Demonstration
4. Context of Assessment	Competency may be assessed in an off and on the job setting
5. Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

DEMONSTRATE ENTREPRENEURIAL SKILLS

UNIT CODE : IT/OS/ICT/BC/4/5

UNIT DESCRIPTION

This unit covers the outcomes required to build and develop the enterprise to be more competitive within a changing business environment, specifically responding to consumer demands while maintaining product quality and accessibility, building a customer base and employee motivation.

ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT	PERFORMANCE CRITERIA
1. Develop business Innovative strategies	1.1 Business innovation strategies are determined in accordance with the organization strategies 1.2 Business innovative strategies are implemented for the purpose of business growth 1.3 Track record and normative capability profile of enterprise and similar businesses are reviewed and considered in setting ***strategic directions***. 1.4 Strengths, weaknesses, opportunities and threats are considered when developing new ideas, approaches, goals and directions 1.5 Decisions about enterprise strategies/directions are made after careful consideration of all relevant information 1.6 ***Business/corporate plan*** is developed that sets out tactics, resource implications, timeframes, production and sales target
2. Develop new products/ markets	2.1 Alternative product/service offerings are canvassed and studied for feasibility 2.2 Potential and new sources/sellers of supplies and raw materials are identified and canvassed. 2.3 Target markets and buyers are identified and surveyed as to their preferences and brand loyalties.
3. Expand customers and product lines	3.1 Enterprise is built up and sustained through responsiveness to market demands and the regulatory environment.

	3.2 Competitive advantage of existing products and services is maintained/enhanced through responsive advocacies and strategies. 3.3 Constant listening to stakeholder/client feedback is ensured to maintain loyal client base.
4. Motivate staff/workers	4.1 Regular dialogue is established and maintained in all levels and relevant sections of the enterprise 4.2 Flow of communications in both directions is encouraged 4.3 Helpful mechanisms and benefits are implemented 4.4 Issues/problems are proactively resolved through win-win solutions wherever practicable
5. Expand employed capital base	5.1 Capital employed in business is continuously reviewed as per the strategic plan 5.2 Business share holdings are reviewed in accordance with the type of business 5.3 Capital employed is expanded according to organization procedures 5.3 Types of shares are determined according to strategic plan 5.4 Shares diversification process is undertaken as per office procedures 5.5 Role of shareholders is determined and implemented in accordance organization procedures
6. Undertake county/ regional business expansion	6.1 Regions for expansion are continuously reviewed in accordance with strategic plan and company's expansion plan 6.2 County business regulations are reviewed and adhered to in accordance with set procedures 6.3 Regional laws and regulations are adhered to in accordance with set procedures 6.4 County/regional business expansion is undertaken in accordance with organization's growth/ expansion plan

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. Strategic directions include but not limited to:	1.1 Business continuity and succession 1.2 Resource access security 1.3 Core competencies development

	1.4 New developments e.g. technological change, new products
2. Business/Corporate plan include but not limited to:	2.1 Action steps and responsibilities of departments and individual workers 2.2 Resource requirements and budget 2.3 Tactics and strategies to achieve objectives
3. Helpful mechanisms include but not limited to:	3.1 Wage and non-wage benefits 3.2 Employee awards and recognition systems 3.3 Employee rights and welfare policies 3.4 Full-disclosure/transparency policies

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:

- Assessing a range of alternative products and strategies
- Critically analyzing information, summarizing and making sense of previous and current market trends
- Identifying changing consumer preferences and demographics
- Thinking "outside the box"
- Ensuring quality consistency
- Reducing lead time to product/service delivery
- Managing operations/ production
- Using formal problem-solving procedures, e. g., root-cause analysis, six sigmas
- Communication skills
- Applying motivational principles, e. g., positive stroking, behavior modification
- Assessing range of alternatives rather than choosing the easiest option
- Achieving ownership and credibility for the enterprise vision
- Critically analyzing information, summarizing and making sense of previous and current market trends
- Developing solutions and practical strategies which are "outside the box"

Required Knowledge

The individual needs to demonstrate knowledge of:

- Features and benefits of common operational practices, e. g., continuous improvement (kaizen), waste elimination,
- Conflict resolution
- Health, safety and environment (HSE) principles and requirements
- Public-relations strategies
- Basic cost-benefit analysis
- Basic financial management

- Business strategic planning
- Impact of change on individuals, groups and industries
- Employee assistance
- Government and regulatory processes
- Local and international market trends
- Product promotion strategies
- Mechanisms in the enterprise
- Market and feasibility studies
- Local and global supply chains Business models and strategies
- Government and regulatory processes
- Local and international business environment
- Concepts of change management
- Relevant developments in other industries
- Capital employed
- Regional/ County business expansion
- Innovation in business

EVIDENCE GUIDE

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

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1 Demonstrated ability to maintain a profitable and stable enterprise as shown by stakeholder feedback, employee testimonies and company financial statements 1.2 Demonstrated ability to conceptualize and plan a micro/small enterprise 1.3 Demonstrated ability to manage/operate a micro/small-scale business 1.4 Demonstrated basic marketing skills
2. Resource Implications	The following resources should be provided: 2.1 Interview guide for entrepreneurs 2.2 Enterprise workers and third parties 2.3 Materials and location relevant to the proposed activity and tasks
3. Methods of Assessment	3.1 Case problems 3.2 Interview 3.3 Portfolio 3.4 Third part reports
4. Context of Assessment	4.1 Competency may be assessed in workplace or in a simulated workplace setting

	4.2 Assessment shall be observed while tasks are being undertaken whether individually or in-group
5. Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

DEMONSTRATE EMPLOYABILITY SKILLS

UNIT CODE: IT/OS/ICT/BC/5/5

UNIT DESCRIPTON

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

ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT These describe the key outcomes which make up workplace function.	**PERFORMANCE CRITERIA** These are assessable statements which specify the required level of performance for each of the elements. ***Bold and italicized terms are elaborated in the Range***
1. Conduct self-management	1.1 Personal vision, mission and goals are formulated based on potential and in relation to organization objectives 1.2 Emotions are managed as per workplace requirements 1.3 Individual performance is evaluated and monitored according to the agreed targets. 1.4 Assertiveness is developed and maintained based on the requirements of the job. 1.5 Accountability and responsibility for own actions are demonstrated. 1.6 Self-esteem and a positive self-image are developed and maintained. 1.7 Time management, attendance and punctuality are observed as per the organization policy. 1.8 Goals are managed as per the organization's objective 1.9 Self-strengths and weaknesses are identified as per ***personal objectives*** 1.10 Critics are managed as per personal objectives
2. Demonstrate interpersonal communication	2.1 Listening and understanding is demonstrated as per communication policy 2.2 Writing to the needs of the audience is demonstrated as per communication policy 2.3 Speaking, reading and writing is demonstrated as per communication policy

	2.4 Empathising is demonstrated as per the communication policy 2.5 Internal and external customers' needs are identified and interpreted as per the communication policy 2.6 Persuasion is demonstrated as per the communication policy 2.7 Communication nnetworks are established as per the SOPs 2.8 Information is shared as per communication structure
3. Demonstrate critical safe work habits	3.1 Stress is managed in accordance with workplace procedures. 3.2 Punctuality and time consciousness is demonstrated in line with workplace policy. 3.3 Personal objectives are integrated with organization goals based on organization's strategic plan. 3.4 Work priorities are set in accordance to workplace procedures. 3.5 Leisure time is recognized in line with organization policy. 3.6 Abstinence from ***drug and substance abuse*** is observed as per workplace policy. 3.7 Awareness of HIV and AIDS is demonstrated in line with workplace requirements. 3.8 Safety consciousness is demonstrated in the workplace based on organization safety policy. 3.9 ***Emerging issues*** are dealt with in accordance with organization policy.
4. Lead small teams	4.1 Performance expectations for the ***team*** are set as per the organization objectives 4.2 Tasks are assigned in accordance with the organization policy. 4.3 Team performance indicators are identified according to set rules and regulations. 4.4 ***Forms of communication*** in a team are established according to office policy. 4.5 Communication is carried out as per workplace place policy and requirements of the job. 4.6 ***Feedback*** on performance is collected and analyzed based on established team learning process 4.7 ***Gender mainstreaming*** is undertaken in accordance with set regulations.
5. Plan and organize work	5.1 Task requirements are identified as per the workplace objectives 5.2 Task is interpreted in accordance with safety (OHS), environmental requirements and quality requirements

	5.3 Work activity is organized with other involved personnel as per the SOPs 5.4 Resources are mobilized, allocated and utilized to meet project goals and deliverables. 5.5 Work activities are monitored and evaluated in line with organization procedures. 5.6 Job planning is documented in accordance with workplace requirements. 5.7 Time is managed achieve workplace set goals and objectives.
6. Maintain professional growth and development	6.1 Personal training needs are identified and assessed in line with the requirements of the job. 6.2 ***Training and career opportunities*** are identified and availed based on job requirements. 6.3 Licensees and certifications relevant to job and career are obtained and renewed. 6.4 ***Personal growth*** is pursued towards improving the qualifications set for the profession. 6.5 Work priorities are identified based on requirement of the job and workplace policy. 6.6 Recognitions are sought as proof of career advancement in line with professional requirements.
7. Demonstrate workplace learning	7.1 Own learning is managed as per workplace policy. 7.2 Learning opportunities are sought and allocated based on job requirement and in line with organization policy. 7.3 Contribution to the learning community at the workplace is carried out. 7.4 ***Range of media for learning*** are identified as per the training need 7.5 Application of learning is demonstrated in both technical and non-technical aspects based on requirements of the job 7.6 Enthusiasm for ongoing learning is demonstrated 7.7 Time and effort is invested in learning new skills-based job requirements 7.8 Willingness to learn in different context is demonstrated based on available learning opportunities arising in the workplace. 7.9 Opportunities for performance improvement are identified proactively in area of work. 7.10 Awareness of personal role in workplace ***innovation*** is demonstrated.

8. Demonstrate problem solving skills	8.1 Problems are identified as per the context of data and circumstances 8.2 Problem solutions are sought based on the problem 8.3 Independence and initiative in identifying and solving problems is demonstrated. 8.4 Team problems are solved as per the workplace guidelines 8.5 Problem solving strategies are applied as per the workplace guidelines
9. Demonstrate workplace ethics	9.1 Policies and guidelines are observed as per the workplace requirements 9.2 Self-worth and profession is exercised in line with personal goals and organizational policies 9.3 Code of conduct is observed as per the workplace requirements 9.4 Personal and professional integrity is demonstrated as per the personal goals 9.5 Commitment to jurisdictional laws is demonstrated as per the workplace requirements

RANGE

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

Range	**Variable**
1. Drug and substance abuse include but not limited to:	Commonly abused 1.1 Alcohol 1.2 Tobacco 1.3 Miraa 1.4 Over-the-counter drugs 1.5 Cocaine 1.6 Bhang 1.7 Glue
2. Feedback includes but not limited to:	2.1 Verbal 2.2 Written 2.3 Informal 2.4 Formal

3. Relationships includes but not limited to:	3.1 Man/Woman 3.2 Trainer/trainee 3.3 Employee/employer 3.4 Client/service provider 3.5 Husband/wife 3.6 Boy/girl 3.7 Parent/child 3.8 Sibling relationships
4. Forms of communication include but not limited to:	4.1 Written 4.2 Visual 4.3 Verbal 4.4 Non verbal 4.5 Formal and informal
5. Team includes but not limited to:	5.1 Small work group 5.2 Staff in a section/department 5.3 Inter-agency group
6. Personal growth includes but not limited to:	6.1 Growth in the job 6.2 Career mobility 6.3 Gains and exposure the job gives 6.4 Net workings 6.5 Benefits that accrue to the individual as a result of noteworthy performance
7. Personal objectives include but not limited to:	7.1 Long term 7.2 Short term 7.3 Broad 7.4 Specific
8. Trainings and career opportunities includes but not limited to	8.1 Participation in training programs ○ Technical ○ Supervisory ○ Managerial ○ Continuing Education 8.2 Serving as Resource Persons in conferences and workshops
9. Resource include but not limited to:	9.1 Human 9.2 Financial 9.3 Technology ○ Hardware ○ Software
10. Innovation include but not limited to:	10.1 New ideas 10.2 Original ideas 10.3 Different ideas 10.4 Methods/procedures

	10.5 Processes 10.6 New tools
11. Emerging issues include but not limited to:	11.1 Terrorism 11.2 Social media 11.3 National cohesion 11.4 Open offices
12. Range of media for learning include but not limited to:	12.1 Mentoring 12.2 peer support and networking 12.3 IT and courses

REQUIRED SKILLS AND KNOWLEDGE

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

Required Skills

The individual needs to demonstrate the following skills:

- Personal hygiene practices
- Intra and Interpersonal skills
- Communication skills
- Knowledge management
- Interpersonal skills
- Critical thinking skills
- Observation skills
- Organizing skills
- Negotiation skills
- Monitoring skills
- Evaluation skills
- Record keeping skills
- Problem solving skills
- Decision Making skills
- Resource utilization skills
- Resource mobilization skills

Required Knowledge

The individual needs to demonstrate knowledge of:

- Work values and ethics
- Company policies
- Company operations, procedures and standards
- Occupational Health and safety procedures
- Fundamental rights at work
- Personal hygiene practices

- Workplace communication
- Concept of time
- Time management
- Decision making
- Types of resources
- Work planning
- Resources and allocating resources
- Organizing work
- Monitoring and evaluation
- Record keeping
- Workplace problems and how to deal with them
- Negotiation
- Assertiveness
- Team work
- Gender mainstreaming
- HIV and AIDS
- Drug and substance abuse
- Leadership
- Safe work habits
- Professional growth and development
- Technology in the workplace
- Learning
- Creativity
- Innovation
- Emerging issues
    - Social media
    - Terrorism
    - National cohesion

EVIDENCE GUIDE

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

1. Critical aspects of Competency	Assessment requires evidence that the candidate: 1.1 Conducted self-management 1.2 Demonstrated interpersonal communication 1.3 Demonstrated critical safe work habits 1.4 Led small teams 1.5 Planned and organized work 1.6 Maintained professional growth and development 1.7 Demonstrated workplace learning

	1.8 Demonstrated problem solving skills 1.9 Demonstrated workplace ethics
2. Resource Implications	The following resources should be provided: 2.1 Case studies/scenarios
3. Methods of Assessment	Competency in this unit may be assessed through: 3.1 Oral Interview 3.2 Observation 3.3 Third Party Reports 3.4 Written
4. Context of Assessment	4.1 Competency may be assessed in workplace or in a simulated workplace setting 4.2 Assessment shall be observed while tasks are being undertaken whether individually or in-group
5. Guidance information for assessment	5.1 Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

DEMONSTRATE ENVIRONMENTAL LITERACY

UNIT CODE: IT/OS/ICT/BC/6/5

UNIT DESCRIPTION

This unit specifies the competencies required to follow procedures for environmental hazard control, follow procedures for environmental pollution control, comply with workplace sustainable resource use, evaluate current practices in relation to resource usage, develop and adhere to environmental protection principles/strategies/guidelines.

ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT These describe the key outcomes which make up workplace function.	**PERFORMANCE CRITERIA** These are assessable statements which specify the required level of performance for each of the elements. ***Bold and italicized terms are elaborated in the Range***
1. 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 always according to environmental regulations and OSHS. 1.3 ***PPE*** is used according to OSHS.
2. Control environmental Pollution control	2.1 Environmental pollution ***control measures*** are compiled following standard protocol. 2.2 Procedures for solid waste management are observed according to Environmental Management and Coordination Act 1999 2.3 Methods for minimizing ***noise pollution*** complied following environmental regulations.
3. Demonstrate sustainable resource use	3.1 Methods for minimizing wastage are complied with. 3.2 Waste management procedures are employed following principles of 3Rs (Reduce, Reuse, Recycle)

	3.3 Methods for economizing or reducing resource consumption are practiced.
4. Evaluate current practices in relation to resource usage	4.1 Information on resource efficiency **systems and procedures** are collected and provided to the work group where appropriate. 4.2 Current resource usage is measured and recorded by members of the work group. 4.3 Current purchasing strategies are analyzed and recorded according to industry procedures. 4.4 Current work processes to access information and data is analyzed following enterprise protocol.
5. Identify Environmental legislations/conventions for environmental concerns	5.1 Environmental ***legislations/conventions*** and local ordinances are identified according to the different ***environmental aspects/impact*** 5.2 ***Industrial standard/environmental practices*** are described according to the different environmental concerns
6. Implement specific environmental programs	6.1 Programs/Activities are identified according to organizations policies and guidelines. 6.2 Individual roles/responsibilities are determined and performed based on the activities identified. 6.3 Problems/constraints encountered are resolved in accordance with organizations' policies and guidelines 6.4 Stakeholders are consulted based on company guidelines
7. Monitor activities on Environmental protection/Programs	7.1 Activities are periodically monitored and evaluated according to the objectives of the environmental Program 7.2 Feedback from stakeholders are gathered and considered in proposing enhancements to the program based on consultations 7.3 Data gathered are analyzed based on evaluation requirements 7.4 Recommendations are submitted based on the findings 7.5 Management support systems are set/established to sustain and enhance the program 7.6 Environmental incidents are monitored and reported to concerned/proper authorities

RANGE

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

Variable	Range
1. ***PPE*** may include but are not limited to:	1.1 Mask 1.2 Gloves 1.3 Goggles 1.4 Safety hat 1.5 Overall 1.6 Hearing protector 1.7 Safety boots
2. ***Environmental pollution control measures*** may include but are not limited to:	2.1 Methods for minimizing or stopping spread and ingestion of airborne particles 2.2 Methods for minimizing or stopping spread and ingestion of gases and fumes 2.3 Methods for minimizing or stopping spread and ingestion of liquid wastes
3. ***Waste management procedures*** may include but are not limited to:	3.1 Sorting 3.2 Storing of items 3.2 Recycling of items 3.3 Disposal of items
4. ***Resources*** may include but are not limited to:	4.1 Electric 4.2 Water 4.3 Fuel 4.3 Telecommunications 4.4 Supplies 4.5 Materials
5. ***Workplace environmental hazards*** may include but are not limited to:	5.1Biological hazards 5.2 Chemical and dust hazards 5.3 Physical hazards
6. ***Organizational systems and procedures*** may include but are not limited to:	6.1 Supply chain, procurement and purchasing 6.2 Quality assurance 6.3 Making recommendations and seeking approvals

REQUIRED SKILLS AND KNOWLEDGE

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

Required Skills

The individual needs to demonstrate the following skills:

- Following storage methods of environmentally hazardous materials
- Following disposal methods of hazardous wastes
- Using PPE

- Practicing OSHS
- Complying environmental pollution control
- Observing solid waste management
- Complying methods of minimizing noise Pollution
- Complying methods of minimizing wastage
- Employing waste management procedures
- Economizing resource consumption
- Listing of resources used
- Measuring current usage of resources
- Identifying and reporting workplace environmental hazards
- Conveying all environmental issues
- Following environmental regulations
- Identifying environmental regulations
- Assessing procedures for assessing compliance
- Collecting information on environmental and resource efficiency systems and procedures, and Providing information to the work group
- Measuring and recording current resource usage
- Analysing and recording current purchasing strategies.
- Analysing current work processes to access information and data and Assisting identifying areas for improvement
- Analysing resource flow
- Determining efficiency of use/conversion of resources
- Determining causes of low efficiency of use
- Developing plans for increasing the efficiency of resource use
- Checking resource use plans
- Complying to regulations/licensing requirements
- Determining benefit/cost of plans
- Ranking proposals based on benefit/cost compared to limited resources
- Checking proposals meet regulatory requirements
- Monitoring implementation
- Adjusting plan and implementation
- checking new resource usage

Required Knowledge

The individual needs to demonstrate knowledge of:

- Storage methods of environmentally hazardous materials
- Disposal methods of hazardous wastes
- Usage of PPE Environmental regulations
- OSHS
- Types of pollution
- Environmental pollution control measures
- Different solid wastes

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

EVIDENCE GUIDE

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

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1 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. 2.4 Resolved problems/ constraints encountered based on management standard procedures 2.5 Implemented and monitored environmental practices on a periodic basis as per company guidelines 2.6 Recommended solutions for the improvement of the Program 2.7 Monitored and reported to proper authorities any environmental incidents
2. Resource Implications	The following resources should be provided: 2.1 Workplace with storage facilities 2.2 Tools, materials and equipment relevant to the tasks (ex. Cleaning tools, cleaning materials, trash bags, etc.) 2.3 PPE 2.4 Manuals and references 2.5 Legislation, policies, procedures, protocols and local ordinances relating to environmental protection 2.6 Case studies/scenarios relating to environmental Protection
3 Methods of Assessment	Competency in this unit may be assessed through: 3.1 Demonstration 3.2 Oral questioning 3.3 Written examination 3.4 Interview/Third Party Reports 3.5 Portfolio (citations/awards from GOs and NGOs, certificate of training – local and abroad) 3.6 Simulations and role-plays
4 Context of Assessment	Competency may be assessed on the job, off the job or a combination of these. Off the job assessment must be undertaken in a closely simulated workplace environment.
5 Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

DEMONSTRATE OCCUPATIONAL SAFETY AND HEALTH PRACTICES

UNIT CODE: IT/OS/ICT/BC/7/5

UNIT DESCRIPTION

This unit specifies the competencies required to lead the implementation of workplace's safety and health program, procedures and policies/guidelines.

ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT These describe the key outcomes which make up workplace function.	**PERFORMANCE CRITERIA** These are assessable statements which specify the required level of performance for each of the elements. ***Bold and italicized terms are elaborated in the Range***
1. Identify workplace hazards and risk	1.1 ***Hazards*** in the workplace and/or its ***indicators*** of its presence, are identified 1.2 ***Evaluation and/or work environment*** measurements of OSH hazards/risk existing in the workplace is conducted by Authorized personnel or agency 1.3 ***OSH issues and/or concerns*** raised by workers are Gathered
2. Identify and implement appropriate control measures	2.1 Prevention ***and control measures***, including use of s***afety gears / PPE (personal protective equipment)*** for specific hazards identified and implemented 2.2 Appropriate ***risk controls*** based on result of OSH hazard evaluation is recommended. 2.3 ***Contingency measures***, including ***emergency procedures*** during workplace ***incidents and emergencies*** are recognized and established in accordance with organization procedures.
3. Implement OSH programs, procedures and policies/ guidelines	3.1 Information to work team about company OSH program, procedures and policies/guidelines are provided 3.2 Implementation of OSH procedures and policies/ guidelines are participated 3.3 Team members are trained and advised on OSH standards and procedures 3.4 Procedures for maintaining ***OSH-related records*** are implemented

RANGE

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

Variable	Range
1. ***Hazards may include*** but are not limited to:	1.1. Physical hazards – impact, illumination, pressure, noise, vibration, extreme temperature, radiation 1.2 Biological hazards- bacteria, viruses, plants, parasites, mites, molds, fungi, insects 1.3 Chemical hazards – dusts, fibers, mists, fumes, smoke, gasses, vapors 1.4 Ergonomics Psychological factors – over exertion/ excessive force, awkward/static positions, fatigue, direct pressure, varying metabolic cycles Physiological factors – monotony, personal relationship, work out cycle 1.6 Safety hazards (unsafe workplace condition) – confined space, excavations, falling objects, gas leaks, electrical, poor storage of materials and waste, spillage, waste and debris 1.7 Unsafe workers' act (Smoking in off-limited areas, Substance and alcohol abuse at work)
2. ***Indicators may include*** but are not limited to:	2.1 Increased of incidents of accidents, injuries 2.2 Increased occurrence of sickness or health complaints/ symptoms 2.3 Common complaints of workers related to OSH 2.4 High absenteeism for work-related reasons
3. ***Evaluation and/or work environment measurements*** may include but are not limited to:	3.1 Health Audit 3.2 Safety Audit 3.3 Work Safety and Health Evaluation 3.4 Work Environment Measurements of Physical and Chemical Hazards
4. ***OSH issues and/or concerns*** may include but are not limited to:	4.1 Workers' experience/observance on presence of work hazards 4.2 Unsafe/unhealthy administrative arrangements (prolonged work hours, no break time, constant overtime, scheduling of tasks) 4.3 Reasons for compliance/non-compliance to use of PPEs or other OSH procedures/policies/guidelines

5. ***Prevention and control measures*** may include but are not limited to:	5.1 Eliminate the hazard (i.e., get rid of the dangerous machine 5.2 Isolate the hazard (i.e. keep the machine in a closed room and operate it remotely; barricade an unsafe area off) 5.3 Substitute the hazard with a safer alternative (i.e., replace the machine with a safer one) 5.4 Use administrative controls to reduce the risk (i.e. give trainings on how to use equipment safely; OSH-related topics, issue warning signages, rotation/shifting work schedule) 5.5 Use engineering controls to reduce the risk (i.e. use safety guards to machine) 5.6 Use personal protective equipment 5.7 Safety, Health and Work Environment Evaluation 5.8 Periodic and/or special medical examinations of workers
6. ***Safety gears /PPE (Personal Protective Equipment's)*** may include but are not limited to:	6.1 Arm/Hand guard, gloves 6.2 Eye protection (goggles, shield) 6.3 Hearing protection (ear muffs, ear plugs) 6.4 Hair Net/cap/bonnet 6.5 Hard hat 6.6 Face protection (mask, shield) 6.7 Apron/Gown/coverall/jump suit 6.8 Anti-static suits 6.9 High-visibility reflective vest
7. Appropriate risk controls	Appropriate risk controls in order of impact are as follows: 7.1 Eliminate the hazard altogether (i.e., get rid of the dangerous machine) 7.2 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) 7.3 Substitute the hazard with a safer alternative (i.e., replace the machine with a safer one) 7.4 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) 7.5 Use engineering controls to reduce the risk (i.e., attach guards to the machine to protect users) 7.6 Use personal protective equipment (i.e., wear gloves and goggles when using the machine)

8. ***Contingency measures*** may include but are not limited to:	8.1 Evacuation 8.2 Isolation 8.3 Decontamination 8.4 (Calling designed) emergency personnel
9. ***Emergency procedures*** may include but are not limited to:	9.1 Fire drill 9.2 Earthquake drill 9.3 Basic life support/CPR 9.4 First aid 9.5 Spillage control 9.6 Decontamination of chemical and toxic 9.7 Disaster preparedness/management 9.8 se of fire-extinguisher
10. ***Incidents and emergencies*** may include but are not limited to:	10.1 Chemical spills 10.2 Equipment/vehicle accidents 10.3 Explosion 10.4 Fire 10.5 Gas leak 10.6 Injury to personnel 10.7 Structural collapse 10.8 Toxic and/or flammable vapors emission.
11. ***OSH-related Records*** may include but are not limited to:	11.1 Medical/Health records 11.2 Incident/accident reports 11.3 Sickness notifications/sick leave application 11.4 OSH-related trainings obtained

REQUIRED SKILLS AND KNOWLEDGE

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

Required Skills

The individual needs to demonstrate the following skills:

- Skills on preliminary identification of workplace hazards/risks
- Knowledge management
- Critical thinking skills
- Observation skills
- Coordinating skills
- Communication skills
- Interpersonal skills
- Troubleshooting skills
- Presentation skills
- Training skills

Required Knowledge

The individual needs to demonstrate knowledge of:

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

EVIDENCE GUIDE

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

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1 Identifies hazards/risks in the workplace and/or its indicators 1.2 Requests for evaluation and/or work environment measurements of OSH hazards/risk in the workplace 1.3 Gathers OSH issues and/or concerns raised by workers 1.4 Identifies and implements prevention and control measures, including use of PPE (personal protective equipment) for specific hazards 1.5 Recommends appropriate risk controls based on result of OSH hazard evaluation and OSH issues gathered 1.6 Establish contingency measures, including emergency procedures in accordance with organization procedures 1.7 Provides information to work team about company OSH program, procedures and policies/guidelines 1.8 Participates in the implementation of OSH procedures and policies/guidelines 1.9 Trains and advises team members on OSH standards and procedures 1.10 Implements procedures for maintaining OSH-related records
2. Resource Implications	The following resources should be provided: 2.1 Workplace or assessment location 2.2 OSH personal records 2.3 PPE 2.4 Health records

3. Methods of Assessment	Competency may be assessed through: 3.1 Portfolio Assessment 3.2 Interview 3.3 Case Study/Situation 3.4 Observation/Demonstration and oral questioning
4. Context of Assessment	Competency may be assessed on the job, off the job or a combination of these. Off the job assessment must be undertaken in a closely simulated workplace environment.
5. Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

COMMON UNIT OF COMPETENCY

APPLY BASIC ELECTRONIC

UNIT CODE:IT/OS/ICT/CC/01/5

UNIT DESCRIPTION

This unit specifies the competencies required to demonstrate basic skills of electronics. It involves identification of electric circuits, electronic components, understand semi-conductor theory, identify and classify memories, apply number systems and identify emerging trends in electronics.

ELEMENTS AND PERFORMANCE CRETIRIA

ELEMENT	PERFORMANCE CRITERIA *(Bold and italicised terms are elaborated in the Range)*
1. Identify electrical circuits	1.1 Electrical circuit are identified 1.2 ***Electrical quantities and their units*** are identified 1.3 ***Types of electrical circuits*** are identified
2. Identify Electronic components	2.1 Identification of electrical components is done 2.2 Characteristic of electronic components are identified 2.3 Application of electronic components are Identified 2.4 Characteristics of integrated circuit are identified
3. Understand Semi-conductor theory	3.1 Explanation of semiconductor theory is done 3.2 Structure of matter is described 3.3 Electrons in conductors and semiconductors are explained 3.4 Types of semiconductor materials are identified 3.5 P-type and N-type materials are explained 3.6 Description of P-N junction diodes operations is done 3.7 ***Types and operations of transistors*** are identified
4. Identify and classify memory	4.1 ***Types of memories*** are identified 4.2 Memory hierarchy is identified 4.3 ***Levels of memory storage*** are identified 4.3 ***Classification of memories*** is done
5. Apply Number Systems and binary coding	5.1 ***Types of number systems*** are identified 5.2 Base conversion is done 5.3 Binary arithmetic operations are done 5.4 ***Binary codes*** are identified 5.5 Representation of decimals in BCD is done 5.6 BCD arithmetic are performed
6. Emerging trends in Electronics	6.1 Description of emerging trends is done 6.2 Challenges of emerging trends are explained

	6.3 Explanation on coping with the emerging trends is done

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** ***May include but is not limited to:***
1. Electrical quantities and their units	1.1 E.M.F in volts 1.2 Power in watts 1.3 Energy in joules 1.4 Resistance in ohms 1.5 Current in amperes
2. Types of electrical circuits	2.1 AC – Alternating Current 2.2 DC – Direct Current
3. Types and operations of transistors	3.1 Types ✓PNP ✓NPN 3.2 Operations ✓Forward biasing ✓Reverse Biasing
4. Types of memories	4.1 Semi-conductor 4.2 Magnetic 4.3 optical
5. Classification of memories	5.1 RAM 5.2 ROM
6. Levels of memory storage	6.1 Internal 6.2 Main 6.3 Online 6.4 Offline bulk
7. Types of number systems	7.1 Decimal 7.2 Binary 7.3 Octal 7.4 Hexadecimal 7.5 Binary Arithmetic's
8. Binary codes	8.1 8421 BCD 8.2 Excess 3 8.3 BCD arithmetic's

REQUIRED KNOWLEDGE AND UNDERSTANDING

The individual needs to demonstrate knowledge and understanding of:

1. Electrical Components
2. Electrical Quantities and units of measurement
3. Electrical circuits
4. Semiconductor theory
5. Number systems
6. Types of Computer memories

FOUNDATION SKILLS

The individual needs to demonstrate the following foundation skills:

1. Communications (verbal and written);
2. Proficient in ICT
3. Time management
4. Problem solving
5. Decision making
6. First aid

EVIDENCE GUIDE

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

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1 Identified Electrical Components, quantities and their units of measurement 1.2 Constructed a simple circuit 1.3 Identified types of transistors and their operations 1.4 Categorized the memories according to their levels, types and hierarchy 1.5 Identified the number systems, binary codes and their operations.
2. Resource Implications	2.1 The following resources must be provided: 2.2 Resources same as that of workplace are advised to be applied 2.3 Including resistors,Transisitors, soldering wire, soldering Iron, printed circuit board, ammeter,volt meter,

	connecting wires, wire stripper,pliers, wire cutter, screw driver, driller,clamps,vise
3. Methods of Assessment	Competency may be assessed through: 3.1 Observation 3.2 Oral questioning 3.3 Practical demonstration
4. Context of Assessment	Competency may be assessed individually in the actual workplace and simulated setting of the actual work place
5. Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

CORE UNITS OF COMPETENCY

PERFORM COMPUTER NETWORKING

UNIT CODE: IT/OS/ICT/CR/1/5

UNIT DESCRIPTION

This unit covers the competencies required to perform computer networking activities. It involves identifying network types, connecting network devices, configuring network components and workstations, networking testing, monitoring and maintaining.

ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT	**PERFORMANCE CRITERIA** ***(Bold and italicised terms are elaborated in the Range)***
1. Identify network type and components	1.1. Types of computer networks are identified 1.2. ***Network components*** are identified ***1.3. Network topologies*** are identified 1.4. Transmission media is identified 1.5. Benefits of computer Networking are identified
2. Connect Network devices	2.1. Tools, materials and devices for network are identified 2.2. Network devices connection is done according ***National and international communication standards*** 2.3. Strength and connectivity tests of cables and equipment are done.
3. Configure network devices	3.1. ***Network software*** is installed and configured according to user manuals. 3.2. IP addressing scheme configuration is done 3.3. Types of subnet masks are identified.

ELEMENT	PERFORMANCE CRITERIA *(Bold and italicised terms are elaborated in the Range)*
5. Configure LAN network type	5.1. Devices for LAN network configuration are identified 5.2. Connection of the devices in LAN is done 5.3. Configuration of the LAN network is done.
4. Perform Network testing	4.1.***Testing tools*** are assembled 4.2.Network components are tested 4.3.Testing of ***connectivity medium*** between components is done 4.4.Network testing is done 4.5.Testing report is generated

RANGE

Variable	**Range** ***May include but is not limited to:***
1. Network components	1.1 Routers 1.2 Switches 1.3 Hub 1.4 RJ 45 cables 1.5 Ports 1.6 Computers 1.7 printers
2. Network topology	2.1 Star 2.2 Ring 2.3 Mesh 2.4 Hybrid 2.5 Point to point
3. Network types	3.1 LAN 3.2 WAN 3.3 MAN
4. Network software	4.1 Operating system
5. Testing tools	5.1 Cable tester 5.2 Volt meter 5.3 Tester 5.4 LAN tornado

REQUIRED KNOWLEDGE AND UNDERSTANDING

The individual needs to demonstrate knowledge and understanding of:

- ❑ Network Types
- ❑ Network topologies
- ❑ Network components
- ❑ LAN Configuration Techniques
- ❑ Transmission Media in Network

FOUNDATION SKILLS

The individual needs to demonstrate the following foundation skills:	
• Communications (verbal and written); • Proficient in ICT; • Time management; • Problem solving;	• Decision making; • First aid;

EVIDENCE GUIDE

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

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1 Identified network components, topologies and types 1.2 Identified Network Transmission media 1.3 Identified Tools, materials and devices for network connection 1.4 Connected Network devices according to the National and international communication standards 1.5 Installed and configured Network software according to user manuals. 1.6 Configured The Network Using IP addressing scheme 1.7 Configured the LAN network 1.8 Assembled Testing tools 1.9 Performed Network testing 1.10 Performed Network monitoring using Appropriate tools
2. Resource Implications	The following resources must be provided: Resources same as that of workplace are advised to be applied Including; 2.1 Computers 2.2 Media 2.3 Routers 2.4 Switches 2.5 Ports Etc
3. Methods of Assessment	Competency may be assessed through: 3.1 Observation 3.2 Oral questioning 3.3 Practical demonstration
4. Context of Assessment	Competency may be assessed individually in the actual workplace and simulated setting of the actual work place
5. Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

INSTALL COMPUTER SOFTWARE

UNIT CODE: IT/OS/ICT/CR/2/5

UNIT DESCRIPTION

This unit covers the competencies required to perform computer software installation work. Installation activities includes identification of the software to be installed, actual installation of the software, software functionality test and user training.

ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT	**PERFORMANCE CRITERIA** *(Bold and italicised terms are elaborated in the Range)*
1. Identify software to be installed	1.1 Software are classified according to the functionality, resource requirement and use. 1.2 Selection of software to be installed is identified based on usage and system requirements 1.3 ***Acquisition methods*** of the selected software are established.
2. Install the software	2.1 ***Software specifications*** and computer resource requirements are identified 2.2 Source of software installation files is determined 2.3 Existing data is backed up 2.4 User vendor agreements are identified 2.5 Software installation is done as per the installation manual provided.
3. Software Configuration Management	3.1 Software configuration management components are identified. 3.2 Importance and reasons for software configuration management are identified
4. Test software functionality	4.1 Software Techniques are identified 4.2 Software test is performed 4.3 Software functionality is determined according to the test performed 4.4 Test report is generated
5. Perform User training	5.1 Determine user skill set 5.2 User training is conducted according to system functionality

RANGE

Variable	Range ***May include but is not limited to:***
1. software acquisition methods	1.1 In – house developed 1.2 Tailor made 1.3 Outsourced/Off-the-shelf
2. Software specifications	2.1 Detailed description of a software system to be installed with its functional and non-functional requirements. Usually has the following characteristics: • Complete. • Consistent. • Feasible. • Modifiable. • Unambiguous. • Testable
3. software parameters	3.1 Characteristic that can help in *defining* or classifying a software.

REQUIRED KNOWLEDGE AND UNDERSTANDING

1. Different types of Software
2. System requirements for software Installation
3. Software Acquisition Methods
4. Types of software Testing
5. Software parameter setting techniques
6. Software Installation procedures

FOUNDATION SKILLS

The individual needs to demonstrate the following foundation skills:
• Communications (verbal and written); • Time management; • Problem solving; • Decision making; • Planning; • First aid; • Report writing; • Creativity

EVIDENCE GUIDE

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

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1 Classified and selected software to be installed according to the functionality, resource requirement and usage 1.2 Identified computer requirements based on Software specifications for Installation 1.3 Determined the source of software to be installed 1.4 Performed Software configuration and Installation 1.5 performed Software testing
2. Resource Implications	2.1 Resources the same as that of workplace are advised to be applied. 2.2 Including Device drivers, operating system, utilities
3. Methods of Assessment	Competency may be assessed through: 3.1 Observation with the help of check list 3.2 Practical demonstrations 3.3 Oral Questioning
4. Context of Assessment	Competency may be assessed individually in the actual workplace or a simulated work place setting
5. Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

1. Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

PERFORM COMPUTER REPAIR AND MAINTENANCE

UNIT CODE: IT/OS/ICT/CR/3/5

UNIT DESCRIPTION

This unit covers the competencies required for performing computer repair and maintenance using diagnosing, repairing and maintenance tools. It involves performing troubleshooting, dismantling of faulty components, repairing/replacing faulty components, up gradation and testing of computer functionality.

ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT	**PERFORMANCE CRITERIA** ***(Bold and italicised terms are elaborated in the Range)***
1. Perform troubleshooting	1.1 Identification of computer parts is done 1.2 Assembling of ***appropriate computer maintenance tools*** and maintenance techniques is done 1.3 Theory of probable cause is established 1.4 Testing of the theory to determine cause is done 1.5 Identification of the problem is established 1.6 Appropriate solution to the problem is performed
2. Disassemble faulty components	2.1 Tools for disassembling are assembled 2.2 Faulty components are disassembled 2.3 Disassembling is performed according to provide ***instruction manuals.***
3. Repair/replace and reassemble components	3.1 Faulty parts to be repaired or replaced are identified 3.2 Acquisition of new parts is done as per the specifications of the components in the case of replacement and repair is done on faulty components. 3.3 Reassemble the repaired or replaced components.
4. Test computer/component functionality	4.1 Switch on the computer for ***POST test*** 4.2 Perform specific component test 4.3 Evaluate test results 4.4 Generate component and system report

ELEMENT	PERFORMANCE CRITERIA *(Bold and italicised terms are elaborated in the Range)*
5. Upgrade computer software/hardware	5.1 Run ***diagnostic program*** 5.2 Install update if any. 5.3

RANGE

Variable	Range ***May include but is not limited to:***
1. Appropriate computer maintenance tools	1.1 Straight-head screwdriver, large and small. 1.2 Phillips-head screwdriver, large and small. 1.3 Tweezers or part retriever. 1.4 Needle-nosed pliers. 1.5 Wire cutters. 1.6 Chip extractor. 1.7 Hex wrench set. 1.8 Torx screwdriver
2. Instruction manuals.	2.1 Refers to an instructional book or booklet that is supplied with almost all technologically advanced consumer product to be used during inspection
3. POST test	4.1 Process performed by firmware or software routines immediately after a computer or other digital electronic device is powered on.
4. Diagnostic program	4.2 Software tool used to diagnose problems with a particular set of hardware devices.

REQUIRED KNOWLEDGE AND UNDERSTANDING

The individual needs to demonstrate knowledge and understanding of:

1. Troubleshooting techniques
2. Procedures and techniques for reassembling
3. Component testing techniques
4. Computer systems and their components
5. The manufacturer's warranty requirements relating to activities for the computer and related components.
6. Types of Computer/component testing
7. Types of Maintenance techniques

FOUNDATION SKILLS

The individual needs to demonstrate the following additional skills:

- Communications (verbal and written);
- Proficient in ICT;
- Time management;
- Analytical
- Faults troubleshooting
- Problem solving;
- Planning;
- Decision making;
- First aid;
- Report writing;

EVIDENCE GUIDE

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

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1 Assembled appropriate computer repair and maintenance tools and performed troubleshooting 1.2 Identified different maintenance techniques 1.3 Identified and disassembled Faulty components 1.4 Performed specific component test 1.5 Repaired or replaced faulty components 1.6 Was able to perform software and hardware upgrade

2. Resource Implications	2.1 Resources the same as that of workplace are advised to be applied Including computer, printers etc
3. Methods of Assessment	Competency may be assessed through: 3.1 Oral questioning 3.2 Practical demonstration 3.3 Observation
4. Context of Assessment	4.1 Competency may be assessed individually in the actual workplace or through simulated work environment
5. Guidance information for assessment	5.1 Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

MANAGE DATABASE SYSTEMS (Ms Access)

UNIT CODE: IT/OS/ICT/CR/4/5

UNIT DESCRIPTION

This unit covers the competencies required to carry out management of Basic databases systems. It involves identification of database concepts, designing of database, Creation and manipulation of database, database testing e.g. using dummy data, implementation of the designed database, establishing transaction and concurrency mechanism and managing database security.

ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT	**PERFORMANCE CRITERIA** *(Bold and italicised terms are elaborated in the Range)*
1. Identify database concepts	1.1 Database concepts are defined 1.2 ***Database models*** are identified 1.3 Identification of merits and demerits of database is done
2. Design Basic database	2.1 Database design concepts are identified 2.2 ***Appropriate database structures*** are determined 2.3 Database design is implemented 2.4 ***Database operations*** are performed
3. Create and manipulate database objects	3.1 Database objects are identified 3.2 Appropriate ***data Attributes*** are applied 3.3 Data relationships are established as per the tables created 3.4 Data is extracted from database using Access.
4. Perform database testing	4.1 Test data is prepared 4.2 Run the test data 4.3 Check the test results 4.4 Validate the results 4.5 Report the findings
5. Print Database Objects	5.1 Database tables are printed 5.2 Database queries are printed 5.3 Database forms and reports are printed

RANGE

Variable	**Range** ***May include but is not limited to:***
1. Database Models	1.1 Relational 1.2 Referential 1.3 Entity Integrity 1.4 Network 1.5 Star schema
2. Database structures	Refers to a collection of record type and field type definitions that comprise your database: 2.1 Record Types. These define the type of entities or research objects you wish to capture (e.g. Person). 2.2 Fields. These are the properties or attributes that describe your record types (e.g. Gender, Age, Height etc.)
3. Database operations	3.1 INSERT 3.2 SELECT 3.3 UPDATE 3.4 DELETE
4. data Attributes	4.1 Atomic Attribute 4.2 Composite Attribute 4.3 Single Valued Attribute 4.4 Multi Valued Attribute 4.5 Stored Attribute 4.6 Derived Attribute 4.7 Null Valued Attribute

REQUIRED KNOWLEDGE AND UNDERSTANDING

The individual needs to demonstrate knowledge and understanding of:

Database concepts
Database design concepts
Database objects

Procedures of printing database objects

FOUNDATION SKILLS

The individual needs to demonstrate the following foundation skills:
• Communications (verbal and written); • Proficient in ICT; • Time management; • Analytical • Faults troubleshooting; • Problem solving; • Planning; • Decision making; • Report writing;

EVIDENCE GUIDE

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

1. Critical Aspects of Competency	**Assessment requires evidence that the candidate:** 1.1 Identified database components 1.2 Performed Database operations 1.3 Applied Appropriate Data Attributes 1.4 Extracted data from database using Access 1.5 Performed test data and validated the results 1.6 Performed printing of database objects
2. Resource Implications	***The following resources must be provided:*** 2.1 Computer 2.2 Database software 2.3 Printer 2.4 Stationery
3. Methods of Assessment	**Competency may be assessed through:** 3.1 Oral questioning 3.2 Practical demonstration

	3.3 Observation
4. Context of Assessment	4.1 Competency may be assessed individually in the actual workplace or through a simulated work place environment
5. Guidance information for assessment	5.1 Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

DEVELOP COMPUTER PROGRAM

UNIT CODE: IT/OS/ICT/CR/5/5

UNIT DESCRIPTION

This unit covers the competencies required to develop computer program

ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT	PERFORMANCE CRITERIA *(Bold and italicised terms are elaborated in the Range)*
1. Identify Programming concepts and approaches	1.1 Identification of program and programming is done 1.2 ***Language translators*** are identified 1.3 Description of ***programming approaches*** is done
2. Identify program development methodologies	2.1 Description of program specifications is done 2.2 Application of program development cycle is done 2.3 Types of development methodologies are identified 2.4 ***Styles of programming*** are identified
3. Identify Program design	3.1 Description of Program design is done 3.2 ***Program design approaches*** are identified 3.3 ***Program design tools*** are identified
4. Identify computer programming languages	4.1 Generations of programming languages are Identified 4.2 Factors for choosing a programming language are determined 4.3 Basic tools for program development are identified
5. Perform Basic structured Programming using C language	5.1 Fundamentals of C programming are identified 5.2 ***Control structures*** in C programming are identified 5.3 Sub programs of C language are explained 5.4 ***C language concepts*** are identified 5.5 C programming environment is identified 5.6 Description of sub programming 5.7 C program format is explained
6. Perform Basic Internet programming	6.1 Internet based programming concepts are identified 6.2 Web programming approaches are identified 6.3 ***Web programming languages*** are identified 6.4 ***Web programming interfaces*** are identified 6.5 HTML coding is done

RANGE

Variable	Range *May include but is not limited to:*
1. Language translators	1.1 Linkers 1.2 Loader 1.3 Interpreters 1.4 Compilers 1.5 Editors
2. Programming approaches	2.1 Procedural 2.2 Event driven 2.3 Object oriented 2.4 Internet based
3. Program design tools	3.1 Flow charts 3.2 Pseudo codes 3.3 Decision trees and tables
4. Styles of programming	4.1 Functional 4.2 Modular 4.3 Visual
5. Control structures	5.1 Sequence 5.2 Selection 5.3 Iteration
6. Web programming languages	6.1 Html 6.2 Php 6.3 JavaScript
7. Web programming Interfaces	7.1 Common client Interface(CCI) 7.2 Common Gateway Interface (CGI)

REQUIRED KNOWLEDGE AND UNDERSTANDING

The individual needs to demonstrate knowledge and understanding of:

1.1	• Programming Generations • Program development cycle • Program Design and Approach • Program design tools • Application of C language techniques • Program Documentation

	• Developing a Simple program

FOUNDATION SKILLS

The individual needs to demonstrate the following foundation skills:
• Communications (verbal and written); • Proficient in ICT; • Time management; • Analytical • Faults troubleshooting; • Problem solving; • Planning; • Decision making; • First aid; • Report writing;

EVIDENCE GUIDE

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

1. Critical Aspects of Competency	**Assessment requires evidence that the candidate:** 1 .1Identified Language translators and programming approaches 1 .2Identified program development cycle and styles of programming. 1 .3Identified Program design approaches and program design tools. 1 .4Identified generations of programming languages. 1 .5Identified factors for choosing programming language. 1 .6Identified basic tools for program development 1 .7Demonstrate language program format 1 .8Demonstrate control structures usage in a program. 1 .9Develop a basic program
2. Resource Implications	***The following resources must be provided:*** Resources the same as that of workplace are advised to be applied Computers, software etc
3. Methods of Assessment	**Competency may be assessed through:** 3.1 Oral test 3.2 Observation

	3.3 Practical demonstration
4. Context of Assessment	Competency may be assessed individually in the actual workplace or through a simulated work place setting
5. Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

MANAGE OPERATING SYSTEM

UNIT CODE: IT/OS/ICT/CR/6/5

UNIT DESCRIPTION

This unit covers the competencies required to select, install and usage of manage operating system

ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT	**PERFORMANCE CRITERIA** ***(Bold and italicised terms are elaborated in the Range)***
1. Identify fundamentals of Operating system	1.1 Definition of Operating system is done 1.2 ***Concepts of operating system*** are identified. 1.3 ***Structures of operating system*** are described. 1.4 ***Types of operating system*** are identified. 1.5 Functions of operating system are identified.
2. Identify process management concepts	2.1 Concepts of processing are identified and explained 2.2 Process states are described 2.3 Definition of ***Concurrency control*** and types is done. 2.4 Explanation of Process scheduling and types of schedulers is done. 2.5 Definition of Deadlocks.
3. Identify concepts of memory management	3.1 Definition of memory management is done. 3.2 Objectives of memory management are identified. 3.3 ***Memory management techniques*** are identified. 3.4 ***Memory management policies*** are identified.
4. Identify concepts of Input and Output devices management.	4.1 Definition of input and output devices is done. 4.2 Objectives of input/output device management are identified. 4.3 Concepts of input and output devices are identified. 4.4 Input/output devices software are explained. 4.5 Description of disk and disk operations are done. 4.6 Explanation of computer clock system is done. 4.7 Computer terminals are identified. 4.8 Virtual devices are defined.
5. Identify concepts of file management	5.1 Definition of file system management is done. 5.2 File system concepts are identified. 5.3 Objectives of file management are identified. 5.4 **File access methods** are identified. 5.5 Description of directory implementation is done 5.6 File allocation techniques are identified. 5.7 File protection and security are identified.
6. Identify Emerging trends in Operating system	6.1 Explanation of emerging trends is done. 6.2 Challenges of emerging trends are identified.

ELEMENT	PERFORMANCE CRITERIA *(Bold and italicised terms are elaborated in the Range)*
	6.3 Ways of coping with emerging trends are identified.

RANGE

Variable	Range *May include but is not limited to:*
1. Concepts of operating system	1 .1Characteristics 1 .2Objectives 1 .3Kernel 1 .4System code 1 .5shell
2. Structures of operating system	2.1 Monolithic 2.2 Layered 2.3 Virtual 2.4 Client server model
3. Types of operating system	3.1 Real time 3.2 Normal 3.3 Batch 3.4 Time sharing
4. Concurrency control	4.1 Inter-process communication 4.2 Synchronization
5. Memory management techniques	5.1 Partitions 5.2 Virtual
6. Memory management policies	6.1 Fetch 6.2 Placement 6.3 Replacement 6.4 cleaning
7. File access methods	7.1 Sequential 7.2 Random 7.3 Indexed sequential

REQUIRED KNOWLEDGE AND UNDERSTANDING

The individual needs to demonstrate knowledge and understanding of:

1.1	Types of operating systems Roles of operating system Objectives of memory management Input/output devices software Computer clock system Objectives of file management File allocation techniques File access methods Challenges of emerging trends in operating systems.

FOUNDATION SKILLS

The individual needs to demonstrate the following foundation skills:	
• Communications (verbal and written); • Proficient in ICT; • Time management; • Analytical • Problem solving; • Planning;	• Decision making; • Report writing;

EVIDENCE GUIDE

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

1. Critical Aspects of Competency	**Assessment requires evidence that the candidate:** 1.1 Defined operating system 1.2 Identified Types of operating systems 1.3 Explained structures of operating systems 1.4 Identified functions of operating systems 1.5 Installed operating system. 1.6 Defined memory management 1.7 Identified memory management and allocation techniques. 1.8 Differentiated the input and output devices. 1.9 Defined computer clock system. 1.10 Explained the hardware concept of input/output device 1.11 Identified file management objectives 1.12 Identified file allocation techniques, access and protection methods.

	2. Identified emerging trends in operating system, challenges and how to cope with them.
2. Resource Implications	***The following resources must be provided:*** Resources the same as that of workplace are advised to be applied Computers, Software, Data and People
3. Methods of Assessment	**Competency may be assessed through:** 3.1 Oral test 3.2 Observation 3.3 Practical demonstration
4. Context of Assessment	Competency may be assessed individually in the actual workplace or through a simulated work place setting
5. Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.