NATIONAL COUNCIL FOR TECHNICAL EDUCATION

NOVEMBER 2022

PROPOSED OCCUPATIONAL STANDARDS

FOR IT TECHNOLOGIST

OCCUPATION: INFORMATION TECHNOLOGY

LEVEL: NTA 8

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FOREWORD

The National Council for Technical Education (NACTE) is a corporate body established by the National Council for Technical Education Act, Cap.129. The Act provides a legal framework for the Council to coordinate the provision of technical education and training in Tanzania. The mandate of NACTE is three-fold, namely; Regulatory, Quality Assurance and Policy Advisory.

In discharging its mandate, the Council has been charged with the responsibilities, among others, to:

(a) assist technical institutions in the transmission of knowledge, principles and training in the field of technical education and training for the benefit of the people of Tanzania;
(b) assist technical institutions in the overall development of the quality of education they provide and to promote and to maintain approved academic standards;
(c) establish and make awards in technical education which are consistent in standard and comparable to related awards in Tanzania and internationally; and
(d) ensure that the quality of education required for the awards is met and maintained throughout the duration of the delivery of the course.

In the course of execution of these responsibilities, the Council has been instituting various measures aiming at advancing the quality of training provided in technical institutions in respect of the changing demands of the labour market, both local and international.

To achieve the above obligation, NACTE, under the Ministry of Education, Science and Technology implemented the East Africa Skills for Transformation and Regional Integration Project (EASTRIP), a project aiming at promoting regional integration through supporting the regional corridors and sector markets, developing common standards and qualifications, and promoting mobility of students, faculty, and graduates. The project supports the Government of Tanzania to address shortage of skills in five sectors namely:

(a) Energy;
(b) Construction;
(c) Information and Communication Technology (ICT);
(d) Transportation; and
(e) Agri-business.

To address the skills, miss-match and shortage in the five (5) sectors in the country, the project funded, among others, a component of Development of Occupational Standards for Technical and Vocational Education and Training (TVET). In this regard, NACTE endeavoured to identify qualified and highly experienced experts in the five sectors from both the industry and training institutions to carry out the development of Occupational Standards for occupations within the five sectors. The exercise was carried out at Morogoro Teachers College, Morogoro, from 27th August to 23rd September, 2021. The output of the exercise is Occupational Standards for 14 occupations. Occupational standards for IT Technologist are among the 14 occupational standards which have been developed.

Since Occupational Standards are statements of work performance reflecting the ability to successfully complete the functions required in an occupation, as well as the application of knowledge, skills, attitudes and understanding in an occupation, it is the Council's expectations that the developed standards will form a robust base for decision making and provide explicit guidance to policy makers, curriculum developers, educators, employers and other stakeholders in matters related to manpower planning as well as execution of Technical and Vocational Education and Training undertakings.

Prof. J. W. Kondoro
Chairman

Dar es Salaam
November 2022

ACKNOWLEDGEMENT

The National Council for Technical Education (NACTE) is charged with the mandate to be the Quality Assurance organ of the Government in matters related to Technical and Vocational Education and Training (TVET) and production of qualified manpower for both local and international labour markets. In order to realize this obligation, NACTE endeavours to institute policies, guidelines and standards and to set the quality benchmarks for training institutions.

However, this is only possible if there is a strong base, linking the training institutions on one hand and the demands of the industry/labour market for relevant manpower on the other hand. Therefore, the Council undertook a step to develop Occupational Standards in sectors considered to be the engine to steer the country's desire to achieve an industrial economy. This exercise would not be a success without the input and support from our stakeholders. I am indebted to acknowledge some of them here.

I wish to acknowledge and appreciate the support from the Ministry of Education, Science and Technology through the East Africa Skills for Transformation and Regional Integration Project (EASTRIP) for the financial support which facilitated the preparation of this document. I also wish to appreciate Mrs Leah Lukindo and Eng. Dr. Simon Baregu for the tireless efforts and commitment in facilitating and guiding the standards development process, Ms. Eileen Tzamburakis and Ms. ChausikuYakweli Ibrahim for compiling and type setting the final document; and the NACTE Secretariat for coordinating the whole exercise.

In a very special way I wish further to extend my sincere gratitude to this team of wonderful experts who tirelessly dedicated their time and availed their invaluable intellect in the preparation of this document. I would like to recognise the colossal inputs of the following experts:

S/N	Name	Designation	Organization
1	Dr. Dennis Lupiana	Lecturer	Institute of Finance Management (IFM)
2	Eng. Dr. Moses Makoko	Head of ICT	University of Dar-es-Salaam – College of Information Communication Technology
3	Dr. Nkundwe Mwasaga	Lecturer	Dar-es-Salam Institute of Technology

In addition, NACTE wishes to further enhance the internationalization of occupational standards and promote the modernization and internationalization of industries, thereby facilitating Tanzania's integration into the international market and expanding its development potential. Therefore, NACTE has invited China-Africa Vocational Education Alliance and China-Africa (Chongqing) Vocational Education Alliance to participate in the development, revision and review of occupational standards documents in collaboration with Chinese vocational institutions, so as to make use of their rich experience in vocational education efforts and rely on China's advanced and complete industrial chain and position in the international market to contribute to the development of vocational education and related industries in Tanzania.

Therefore, I would like to express my sincere gratitude to this specialized team of many Chinese institutions and experts. I thank them for their hard work and dedication, and for contributing their wisdom and experience to the preparation of this document. I would like to thank the following institutions and experts for their support:

S/N	Institute	Name	Title/Area of Expertise
1	Chengdu Polytechnic	Jian Xianrui	Associate Dean of School of Software /Associate Professor/Computer Science and Technology
2		Zhu Weiping	Associate Professor/ Educational Technology
3		Zhang Chunrong	Associate Professor/Computer Networking and Security
4		An Ning	Teaching Assistant/Computer Network Technology
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19		Liang Ying	Lecturer/Computer Science and Technology
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Dr. A. B. Rutayuga
Executive Secretary

Dar es Salaam
November 2022

ABREVIATIONS

ICT	Information and Communication Technology
NACTE	National Council for Technical Education
NOS	National Occupational Standards
OS	Occupational Standards
TET	Technical Education and Training
TVET	Technical and Vocational Education and Training

GLOSSARY OF TERMS

Circumstantial Knowledge:	Detailed knowledge, which allows the decision-making in regard to different circumstances and cross cutting issues
Competence:	The ability to use knowledge, understanding, practical and thinking skills to perform effectively to the workplace standards required in employment.
Competency:	A description of the ability one possesses when able to perform a given occupational task effectively and efficiently.
Competency-Based Education:	An instructional program that derives its content from validated tasks and bases assessment on the learner's performance
Curriculum:	A description or composite of statements about "what is to be learned" by the trainee/student in a particular instructional programme; a product that states the "intended learning outcomes".
Educational/Training Programme:	The complete curriculum and instruction (what and how) that is designed to prepare a person for employment in a job or other particular performance situation.
Occupation:	A specific position requiring the performance of specific tasks – essentially the same tasks are performed by all employees having the same title. (Example: baker)
Occupational Analysis:	A process used to identify the tasks that are important to employees in any given occupation
Occupational Area	This is a broad grouping of related jobs. Example: food service
Occupational Competence	The application of knowledge and skills to perform consistently to the standards required in the work context.
Occupational Standards:	Specific requirements of competences people are expected to demonstrate in a particular occupational area, including knowledge and relevant attitudes. They also act as performance tool of assessment of the pre – scribed outcomes.

Performance Criteria:	Indicate the expected end results or outcome in form of evaluative statements.
Skills:	The ability to perform occupational tasks with a high degree of proficiency within a given occupation. Skill is conceived of as a composite of three completely interdependent components: cognitive, affective, and psychomotor.
Standards:	It is a set of statement, which if proved true under working conditions, means that an individual is meeting an expected level and type of performance
Task Analysis:	The process of analysing each task to determine the steps, related knowledge, attitudes, performance standards, tools and materials needed, and safety concerns required of employees performing it.
Tasks:	A work activity that has a definite beginning and ending, is observable or measurable, consists of two or more definite steps, and leads to a product, service, or decision.
Underpinning Knowledge:	This is crucial knowledge that an individual must acquire in order to demonstrate competences that are associated in performing a given task.
Verification Process:	The process of having experts review and conform the importance of the task (competency) statements identified through occupational analysis. Other questions, such as the degree of task learning difficulty are also frequently asked. This process is also sometimes referred to as validation.

1.0 INTRODUCTION

Technical Education and Training (TET) is one of the most important education sub-sectors in Tanzania, responsible for developing a skilled workforce to support the country's industrialization economic agenda. Tanzania's Development Vision 2025 intends to raise the country's economy to a middle-income status. This requires a skilled workforce that is aligned with the needs of the public and private sectors of the economy. The National Council for Technical Education has begun the job of drafting Occupational Standards that will eventually be adopted as National Occupational Standards for TET in order to ensure that it meets the needs of the labour market and the country's economic agenda.

National Occupational Standards (NOS) are performance criteria that are matched with labour market demands. Each National Occupation Standard describes functions, performance standards, and knowledge/understanding for one important function or task. They combine skills, knowledge, and attitudes to describe best practice. They are useful tools for establishing job roles, personnel recruiting, supervision, and appraisal, as well as TET standards. They're also helpful for benchmarking and harmonizing qualifications on a national and international level. Standards, in general, provide a solid framework for high-quality TET that is labour market-relevant, current and consistent in delivery across all public and private institutions.

However, it must be noted that, Occupational Standards and Training standards/qualifications standards are different. Occupational standards are defined in terms of activities performed by a person in a selected occupation (e.g., an electrical engineer designs electrical wiring circuits, performs trouble shooting in electrical wiring, etc.) and they are usually defined by employers following procedures agreed upon by all stakeholders. Education and training standards are developed from the activities defined in occupational standards, and they include learning objectives to ensure that the necessary skills and knowledge are developed by a person to enable him or her to function at an agreed level in an occupation. Education and Training standards are used to define curricula in training institutions. It is however critical that there must be a direct link between the occupational standards and the training standards to respond to demands of the labour market.

In TET delivery, Tanzania adopted the Competency-based Education and Training (CBET) approach. The CBET approach focuses on providing learners with the skills and knowledge

required to meet the occupational standards. Occupational standards are thus the starting point for developing Competency-based Education and Training (CBET) programs. TET institutions will be required to benchmark their curricula with relevant occupational standards. Occupational Standards are developed based on a given occupation's current and future demands. As a result, they serve as a means of bridging the gap between the worlds of employment and technical education and training (TET).

The IT Technologist Occupation has its own set of occupational standards. The document explains how the occupational standards were developed, as well as the scope, the occupational profile in the form of DACUM charts, and the Occupational Standards.

2.0 OCCUPATIONAL STANDARD DEVELOPMENT PROCESS

The Occupational standards development process began with an examination of major documents that guide Tanzanian skill development. The 10-year National Skills Development Strategy (2016-2026) was one of the documents reviewed, and it outlined six (6) economic sectors that should be prioritized when developing skills development programmes.

These sectors include: Transport and logistics, Tourism and Hospitality, Agribusiness, Construction, Energy and ICT. NACTE labour market reports were also used in the literature review to determine the skills demand in the Tanzanian labour market as a whole.

After the literature review, a workshop comprised of expert practitioners and educators with substantial knowledge and experience in the occupation conducted an occupational analysis utilizing the DACUM approach to produce the occupational profile. The analysis resulted in DACUM Charts, which are attached as **Appendix 1** to this document.

The occupational standards were then developed. Experts in Occupational Analysis and the Development of Occupational Standards facilitated the workshop. Interviews, online surveys, and a stakeholder forum were used to verify and validate the occupational standards. Engineers, supervisory technicians on the job, and experienced IT Technologists were key informants in the survey to discover occupational trends. This information was used to gain insight from the workplaces regarding trends and changes in the profession, including how well graduates are prepared for working in the occupation. A total of …….. online surveys were completed by experts from the labour market across the country. Apart from the survey

aiding in defining the scope for the occupational analysis, they served to engage a wide cross-section of experts in the occupation. The stakeholders' forum was attended by …… participants from different parts of the country representing various companies.

3.0 THE SCOPE AND OVERVIEW OF THE OCCUPATION STANDARDS FOR IT TECHNOLOGISTS

These standards cover a broad range of duties and tasks that can be performed by an IT Technologist. However, the occupational standards are not meant to replace individual job descriptions, they are to be used for guidance in defining skill levels and knowledge for the IT Technologist in specific settings or positions. The IT Technologist may perform tasks in a number of key areas of the occupational standards, but not necessarily in all areas. For example, in large operations other individuals may be employed or designated to perform specific tasks.

An IT Technologist orchestrates the technological efficiency of an organization, including managing the computer performance, communications, and networking. IT Technologists also work on managing software and hardware technologies, project management, business analysis, IT governance and work with external partners, including vendors, consultants, and agencies, to keep up with system integration. They must always keep up with the latest advancements in technology, as being well informed of these advancements is essential to the on-going development of the business.

These Occupational standards cover the following main duties for an IT Technologist:

1. Use ICT governance tools
2. Build small network systems
3. Manage ICT device assets
4. Maintain ICT terminal business software
5. Maintain ICT server system software
6. Manage small ICT project R&D process
7. Implement small ICT project R&D
8. Manage enterprise ICT project engineering implementation process
9. Develop and improve enterprise ICT products
10. Manage enterprise ICT product or service providers
11. Develop ICT tools in an organization
12. Develop ICT acquisition plan

13. Manage computer systems security
14. Manage user technical support system
15. Manage complex computer networks
16. Introduce emerging ICT solutions
17. Manage cloud computing-based applications and services
18. Evaluate system requirements
19. Evaluate designs of business information systems
20. Manage business information systems
21. Manage ICT projects

These Occupational Standards have been clustered to fit into NACTE qualification levels i.e. NTA Level 7 and Level 8.

4.0 VALIDITY PERIOD

The occupational standards will be valid for 3-5 years due to the fast-changing nature of technology. The review will take the same approach as developing a new standard, based on current labour market Information.

5.0 OCCUPATIONAL STANDARDS

5.1 OCCUPATIONAL STANDARDS FOR IT TECHNOLOGIST – NTA 8

OCCUPATION	IT TECHNOLOGIST	**OCCUPATION CODE**	
DUTY TITLE	DEVELOP ICT GOVERNANCE TOOLS IN AN ORGANIZATION	**DUTY NO.**	801
TASK TITLE	PREPARE ICT GOVERNANCE TOOLS IN AN ORGANIZATION	**TASK NO.**	8011
PERFORMANCE CRITERIA	A person performing this task must be able to prepare ICT governance tools in an organization as per industry standards and national ICT governance guidelines.		
RANGE STATEMENT	This task can be performed in a workshop or in a client's office. The following equipment and tools should be available: 1. Computer; 2. Relevant software tools; 3. Relevant guidelines; 4. Computer technician's tool kit. This person shall work under minimum supervision.		

EVIDENCE REQUIREMENTS

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Identify the features of the software tools to meet the business requirements based on the business scenario of the job; 2. Identify structures of ICT tools; 3. Develop ICT governance tools; 4. Observe health and safety precautions when performing the task; 5. Clean workplace; 6. Store tools.	**Detailed knowledge about:** **1.0. Methods:** The person must be able to explain how to: 1.1. Identify required ICT governance tools; 1.2. Identify report structures of ICT governance tools; 1.3. Develop ICT governance tools; 1.4. Clean the workplace. **2.0. Principles:** The person must be able to explain the principles of: 2.1. Preparing ICT Governance tools; 2.2. Developing ICT governance tools. **3.0. Theories:** The person must be able to explain: 3.1. Methods of development of ICT governance tools; 3.2. Preparation of ICT Governance tools. **4.0. Essential skills:** 4.1 Problem solving skills; 4.2 Critical thinking skills; 4.3 Analytical skills; 4.4 Communication skills; 4.5 Report writing skills; 4.6 Interpersonal skills; 4.7 Teamwork skills; 4.8 Leadership skills; 4.9 Program design skills; 4.10Requirements functional analysis skills.
DESCRIPTION OF END PRODUCTS/SERVICE	ICT governance tools in an organization are prepared as per industry standards and ICT governance

	guideline.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Programming basics; 2. Software engineering basics; 3. Program development basics.

OCCUPATION	IT TECHNOLOGIST	**OCCUPATION CODE**	
DUTY TITLE	DEVELOP ICT GOVERNANCE TOOLS IN AN ORGANIZATION	**DUTY NO.**	801
TASK TITLE	ASSESS IMPLEMENTATION OF ICT GOVERNANCE TOOLS IN AN ORGANIZATION	**TASK NO.**	8012
PERFORMANCE CRITERIA	A person performing this task must be able to assess implementation of ICT governance tools in an organization as per industry standards and ICT governance guideline.		
RANGE STATEMENT	This task can be performed in a workshop or in a client's office. The following equipment and tools should be available: 1. Computer; 2. Relevant software tools; 3. Relevant guidelines; 4. Computer technician's tool kit. This person shall work under minimum supervision.		

EVIDENCE REQUIREMENTS	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Determine the operation of monitoring scenarios based on the operational status of the ICT governance tools; 2. Analyze the results of the ICT governance tool operation and prepare assessment reports; 3. Review resource management; 4. Evaluate ICT governance tools; 5. Create assessment report; 6. Observe health and safety precautions when performing the task; 7. Clean workplace; 8. Store tools.	**Detailed knowledge about:** **1.0. Methods:** The person must be able to explain how to: 1.1. Monitor operation of ICT governance tools; 1.2. Analyze the results of operation of ICT governance tools; 1.3. Prepare assessment report; 1.4. Evaluate ICT governance tools; 1.5. Create assessment report; 1.6. Clean the workplace. **2.0. Principles:** The person must be able to explain the principles of: 2.1. Assessing implementation of ICT governance tools; 2.2. Reviewing resource management using ICT governance tools. **3.0. Theories:** The person must be able to explain: 3.1. Types of assessment of implementation of ICT governance tools; 3.2. Reviewing resource management in the implementation of ICT governance tools. **4.0. Essential skills:**Problem solving skills; 4.2 Critical thinking skills; 4.3 Analytical skills; 4.4 Communication skills; 4.5 Report writing skills; 4.6 Interpersonal skills;

	4.7 Teamwork skills; 4.8 Leadership skills; 4.9 Project management skills; 4.10 Time management skills.
DESCRIPTION OF END PRODUCTS/SERVICE	Implementation of ICT governance tools in an organization is assessed as per industry standards and ICT governance guideline.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Knowledge of software performance evaluation; 2. System testing basics.

OCCUPATION	IT TECHNOLOGIST	**OCCUPATION CODE**	
DUTY TITLE	DEVELOP ICT GOVERNANCE TOOLS IN AN ORGANIZATION	**DUTY NO.**	801
TASK TITLE	REVIEW ICT GOVERNANCE TOOLS IN AN ORGANIZATION	**TASK NO.**	8013
PERFORMANCE CRITERIA	A person performing this task must be able to review ICT governance tools in an organization as per industry standards and national ICT governance guidelines.		
RANGE STATEMENT	This task can be performed in a workshop or in a client's office. The following equipment and tools should be available: 1. Computer; 2. Relevant software tools; 3. Relevant guidelines; 4. Computer technician's tool kit. This person shall work under minimum supervision.		

EVIDENCE REQUIREMENTS

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Control technology risks based on ICT governance tools assessment reports; 2. Identify the content of ICT changes and update ICT governance tools; 3. Observe health and safety precautions when performing the task; 4. Clean workplace; 5. Store tools.	**Detailed knowledge about:** **1.0. Methods:** The person must be able to explain how to: 1.1. Interpret assessment reports for implementation of ICT governance tools; 1.2. Identify technology changes; 1.3. Identify organization needs; 1.4. Control risk factors; 1.5. Update ICT governance tools. **2.0. Principles:** The person must be able to explain the principles of: 2.1. Reviewing governance ICT tools; 2.2. Controlling risk factors using ICT governance tools. **3.0. Theories:** The person must be able to explain: 3.1. Types of Reviewing for governance ICT tools; 3.2. Updating of ICT governance tools. **4.0. Essential skills:** 4.1 Problem solving skills; 4.2 Critical thinking skills; 4.3 Analytical skills; 4.4 Communication skills; 4.5 Report writing skills; 4.6 Interpersonal skills; 4.7 Teamwork skills; 4.8 Leadership skills; 4.9 Project management skills; 4.10 Project quality control skills.

DESCRIPTION OF END PRODUCTS/SERVICE	ICT governance tools in an organization are reviewed as per industry standards and national ICT governance guidelines.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Knowledge of project risk management; 2. Knowledge of project quality control.

OCCUPATION	IT TECHNOLOGIST	**OCCUPATION CODE**	
DUTY TITLE	DEVELOP ICT ACQUISITION PLAN IN AN ORGANIZATION	**DUTY NO.**	802
TASK TITLE	REVIEW A LIST OF ICT SYSTEMS AND SERVICES REQUIRED IN AN ORGANIZATION	**TASK NO.**	8021
PERFORMANCE CRITERIA	A person carrying out this task must be able to review a list of ICT systems and services required in an organization as per industry standards and national ICT procurement guidelines.		
RANGE STATEMENT	This task can be achieved in a client's office or workshop. The following items and tools must be available: 1. Computer; 2. Institution's manual; 3. ICT assets inventory; 4. Relevant reporting software tools; 5. Computer technician's tool kit. This person shall work independently.		

EVIDENCE REQUIREMENTS

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Identify the ICT systems and services in the list; 2. Compare the list of ICT systems and services with the requirements; 3. Review the technical list of ICT systems and services; 4. Review the ICT system suppliers; 5. Review ICT service providers; 6. Review business information system pricing; 7. Prepare the review report; 8. Approve the list of ICT systems and services; 9. Observe health and safety precautions; 10. Clean workplace and store tools.	**Detailed knowledge about:** **1.0. Methods:** The person must be able to explain how to: 1.1. Identify the ICT systems and services in the list; 1.2. Compare the list of ICT systems and services with the requirements; 1.3. Approve the list of ICT systems and services; 1.4. Complete the review report. **2.0. Principles:** The person must be able to explain the principles of: 2.1. Approving the list of ICT systems and services; 2.2. Comparing the list of ICT systems and services with the requirements. **3.0.Theories**: The person must be able to explain: 3.1. Types of computer services; 3.2. Types of business information systems; 3.3. Types of computer hardware and accessories; 3.4. ICT service outsourcing. **4.0. Essential Skills:** 4.1. Problem solving skills; 4.2. Critical thinking skills; 4.3. Analytical skills;

	4.4. Communication skills; 4.5. Report writing skills; 4.6. Interpersonal skills; 4.7. Teamwork skills; 4.8. Leadership skills; 4.9. Project management skills; 4.10. Time management skills.
DESCRIPTION OF END PRODUCTS/SERVICE	A list of ICT systems and services required in an organization is reviewed as per industry standards and national ICT guidelines.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Business information systems; 2. Computer hardware and accessories; 3. Extent of responsibilities.

OCCUPATION	IT TECHNOLOGIST	**OCCUPATION CODE**	
DUTY TITLE	DEVELOP ICT ACQUISITION PLAN IN AN ORGANIZATION	**DUTY NO.**	802
TASK TITLE	DEVELOP ICT ACQUISITION PLAN IN AN ORGANIZATION	**TASK NO.**	8022
PERFORMANCE CRITERIA	A person carrying out this task must be able to develop ICT acquisition plan in an organization as per industry standards and national ICT procurement guidelines.		
RANGE STATEMENT	This task can be achieved in a client's office or workshop. The following items and tools must be available: 1. Computer; 2. Institution's manual; 3. ICT assets inventory; 4. Relevant reporting software tools; 5. Computer technician's tool kit. This person shall work independently.		

EVIDENCE REQUIREMENTS	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Identify items to be acquired; 2. Modify the list of items to be acquired; 3. Organize the projects; 4. Develop the ICT acquisition plan; 5. Complete standard specifications in accordance with the acquisition plan; 6. Compare and analyze ICTs and service providers; 7. Plan acquisition cycle; 8. Observe health and safety precautions; 9. Clean workplace; 10. Store tools.	**Detailed knowledge about:** **1.0. Methods:** The person must be able to explain how to: 1.1. Interpret the list of items in the requirements; 1.2. Identify items to be acquired; 1.3. Modify the list of items to be acquired; 1.4. Organize the projects; 1.5. Develop the ICT acquisition plan. **2.0. Principles:** The person must be able to explain the principles of: 2.1. Acquiring ICT systems and services; 2.2. Explaining the list of projects based on requirements. **3.0. Theories**: The person must be able to explain: 3.1. Types of computer services; 3.2. Types of business information systems; 3.3. Types of computer hardware and accessories; 3.4. ICT service outsourcing; 3.5. Commercial information systems; 3.6. Computer hardware and accessories. **4.0. Essential Skills:** 4.1. Problem solving skills; 4.2. Critical thinking skills; 4.3. Analytical skills;

	4.4. Communication skills; 4.5. Report writing skills; 4.6. Interpersonal skills; 4.7. Teamwork skills; 4.8. Leadership skills; 4.9. Project management skills; 4.10. Time management skills.
DESCRIPTION OF END PRODUCTS/SERVICE	ICT acquisition plan in an organization is developed as per industry standards and national ICT guidelines.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Business information systems; 2. Computer hardware and accessories; 3. Extend of responsibilities.

OCCUPATION	IT TECHNOLOGIST	**OCCUPATION CODE**	
DUTY TITLE	DEVELOP ICT ACQUISITION PLAN IN AN ORGANIZATION	**DUTY NO.**	802
TASK TITLE	ASSESS ICT ACQUISITION PLAN IN AN ORGANIZATION	**TASK NO.**	8023
PERFORMANCE CRITERIA	A person carrying out this task must be able to assess ICT acquisition plan in an organization as per industry standards and national ICT procurement guidelines.		
RANGE STATEMENT	This task can be achieved in a client's office or workshop. The following items and tools must be available: 1. Computer; 2. Institution's manual; 3. ICT assets inventory; 4. Relevant reporting software tools; 5. Computer technician's tool kit. This person shall work independently.		

EVIDENCE REQUIREMENTS	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Review the current year's ICT acquisition plan; 2. Assess the implementation of the plan; 3. Assess the acquisition cycle; 4. Conduct the argument based on the acquisition requirements to ensure the efficient use of funds and resources; 5. Prepare assessment report; 6. Observe health and safety precautions; 7. Clean workplace; 8. Store tools.	**Detailed knowledge about:** **1.0. Methods:** The person must be able to explain how to: 1.1. Review the current year's ICT acquisition plan; 1.2. Assess the implementation of the plan; 1.3. Assess the acquisition cycle; 1.4. Prepare assessment report; 1.5. Produce an ICT acquisition plan. **2.0. Principles:** The person must be able to explain the principles of acquiring ICT systems and services **3.0. Theories**: The person must be able to explain: 3.1. Types of computer services; 3.2. Types of business information systems; 3.3. Types of computer hardware and accessories; 3.4. ICT service outsourcing. **4.0. Essential Skills:** 4.1. Problem solving skills; 4.2. Critical thinking skills; 4.3. Analytical skills; 4.4. Communication skills; 4.5. Report writing skills;

	4.6. Interpersonal skills; 4.7. Teamwork skills; 4.8. Leadership skills; 4.9. Project management skills; 4.10. Time management skills.
DESCRIPTION OF END PRODUCTS/SERVICE	ICT acquisition plan in an organization is assessed as per industry standards and national ICT procurement guidelines.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Business information system; 2. Computer hardware and accessories; 3. Extend of responsibilities.

OCCUPATION	IT TECHNOLOGIST	**OCCUPATION CODE**	
DUTY TITLE	MANAGE COMPUTER SYSTEMS SECURITY IN AN ORGANIZATION	**DUTY NO.**	803
TASK TITLE	INTERPRET ICT SECURITY POLICIES AND STANDARDS IN AN ORGANIZATION	**TASK NO.**	8031
PERFORMANCE CRITERIA	A person performing this task must be able to interpret ICT security policies and standards in an organization as per industry standards, and international and national ICT security guidelines.		
RANGE STATEMENT	This task can be performed in a workshop or in a client's office. The following equipment and tools should be available: 1. Operating Systems resource monitors; 2. System development guideline; 3. Computer system; 4. Computer technician's tool kit. This person shall work under minimum supervision.		

EVIDENCE REQUIREMENTS

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Set policies and standards for management security; 2. Set operational security policies; 3. Set physical security procedures; 4. Identify common cyber attacks; 5. Observe health and safety precautions when performing the task; 6. Clean workplace; 7. Store tools.	**Detailed knowledge about:** **1.0. Methods:** The person must be able to explain how to: 1.1. Set policies and standards for management security; 1.2. Set operational security policies; 1.3. Set physical security procedures; 1.4. Identify common cyber attacks. **2.0. Principles:** The person must be able to explain the principles of: 2.1. Setting policies and standards for management security; 2.2. Setting operational security policies; 2.3. Interpreting security policies and standards. **3.0. Theories:** The person must be able to explain: 3.1. Types of security policies and standards; 3.2. Identifying common cyber attacks. **4.0. Essential skills:** 4.1 Problem solving skills; 4.2 Critical thinking skills; 4.3 Analytical skills; 4.4 Communication skills; 4.5 Report writing skills; 4.6 Interpersonal skills; 4.7 Teamwork skills; 4.8 Leadership skills;

	4.9 Project management skills; 4.10Time management skills.
DESCRIPTION OF END PRODUCTS/SERVICE:	Interpretation of ICT security policies and standards in an organization are conducted as per industry standards, and international and national ICT security guidelines.
CIRCUMSTANTIAL KNOWLEDGE:	**Detailed knowledge about:** 1. Safe handling of system software and business information system; 2. Safe handling of software; 3. Extent of responsibilities.

OCCUPATION	IT TECHNOLOGIST	**OCCUPATION CODE**	
DUTY TITLE	MANAGE COMPUTER SYSTEMS SECURITY IN AN ORGANIZATION	**DUTY NO.**	803
TASKTITLE	IMPLEMENT ICT SECURITY SYSTEM IN AN ORGANIZATION	**TASK NO.**	8032
PERFORMANCE CRITERIA	A person carrying out this task must be able to implement ICT security system in an organization as per the industry standards, and international and national legislations and regulations.		
RANGE STATEMENT	This task can be performed in a client's office. The following equipment and tools should be available: 1. ISO security guidelines; 2. Designers' manuals; 3. Manufacturers' manuals; 4. Networking tools; 5. High end computers; 6. Security hacking tools; 7. Security Laws; 8. Security Regulations; 9. Relevant equipment. This person shall work independently		

EVIDENCE REQUIREMENTS	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Identify and use ICT security tools; 2. Identify security control measures; 3. Customize the IT security solution for cyber attacks; 4. ICT system security settings;; 5. Maintain confidentiality, privacy, quality, reliability and integrity of ICT system 6. Observe health and safety precautions when perfoming the task; 7. Clean workplace; 8. Store tools.	**Detailed knowledge about:** **1.0. Methods:** The person must be able to explain how to: 1.1. Differentiate different ICT security tools; 1.2. Use ICT security tools; 1.3. Harden ICT systems security; 1.4. Customize ICT security solutions; 1.5. Set up and maintain security of ICT devices; 1.6. Set up and maintain security of ICT services; 1.7. Set up and maintain security of ICT systems users. **2.0. Principles:** The person must be able to explain the principles of: 1.1. Customizing ICT system security solutions for cyber attacks; 1.2. Setting up the security of the ICT system; 1.3. Maintaining confidentiality, privacy, quality, reliability and integrity of the ICT system. **3.0. Theories:** The person must be able to explain: 3.1. Human threat behaviors; 3.2. Cryptographic applications; 3.3. Common cyber attacks;

	3.4. Penetration Testing; 3.5. Vulnerability Assessment; 3.6. Firewall techniques; 3.7. AAA technique; 3.8. Intrusion detection and prevention; 3.9. OS security; 3.10. WEB security; 3.11. Threats hunting; 3.12. Incidents response. **4.0. Essential skills** 4.1. Problem solving skills; 4.2. Critical thinking skills; 4.3. Analytical skills; 4.4. Communication skills; 4.5. Report writing skills; 4.6. Interpersonal skills; 4.7. Teamwork skills; 4.8. Leadership skills; 4.9. Project management skills; 4.10. Time management skills.
Description of the end products	Implementation of ICT security system is conducted in an organization as per industry standards, and international and national legislations and regulations.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Human risk behaviour; 2. Cyber security attacks; 3. Industrial espionage; 4. Authentication and Authorization; 5. Data leakage prevention; 6. Critical information infrastructure protection; 7. Protection of personally identifiable information; 8. Extend of responsibilities.

OCCUPATION	IT TECHNOLOGIST	**OCCUPATION CODE**	
DUTY TITLE	MANAGE COMPUTER SYSTEMS SECURITY IN AN ORGANIZATION	**DUTY NO.**	803
TASK TITLE	IMPLEMENT SECURITY MANAGEMENT OF ICT SYSTEM IN AN ORGANIZATION	**TASK NO.**	8033
PERFORMANCE CRITERIA	A person carrying out this task must be able to manage the security of ICT systems in an organization as per industry standards, and international and national legislations and regulations.		
RANGE STATEMENT	This task can be performed in a client's office. The following equipment and tools should be available: 1. ISO privacy guidelines; 2. Designers' manuals; 3. Manufacturers' manuals; 4. Networking tools; 5. High end computers; 6. Security hacking tools; 7. Security Laws; 8. Security Regulations; 9. Relevant equipment. This person shall work independently		

EVIDENCE REQUIREMENTS

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Develop an organization's information security risk management system in accordance with relevant national regulations; 2. Develop a disposal plan for the security risks of an organization's business systems and supervise and manage the risks; 3. Reasonably rank the network and information system according to the business situation of the organization; 4. Master the data security protection requirements related to critical information infrastructure; 5. Establish an early warning mechanism for information security event threats; 6. Deal with information security events of an organization in a	**Detailed knowledge about:** **1.0. Methods:** The person must be able to explain how to: 1.1. Knowledge of information security risk management; 1.2. Knowledge of network security level protection; 1.3. Maintain network and devices inventory; 1.4. Information security incident warning mechanisms; 1.5. Information security incident response programming methods; 1.6. Conduct system security training for employees; 1.7. Clean work areas. **2.0. Principles;** The person must be able to explain the principles of: 1.1. Information security risk management; 1.2. Network security level protection. **3.0. Theories:** The person must be able to explain: 3.1 Knowledge of information security risk management; 3.2 Knowledge of network security level protection;

timely manner; 7. Train staff on systems security; 8. Observe health and safety precautions when performing the task; 9. Clean workplace; 10. Store tools.	3.3 Knowledge of network security management system; 3.4 Critical information infrastructure security requirements; 3.5 Incidents response; 3.6 Privacy protection. **4.0. Essential skills** 4.1. Problem solving skills; 4.2. Critical thinking skills; 4.3. Analytical skills; 4.4. Communication skills; 4.5. Report writing skills; 4.6. Interpersonal skills; 4.7. Teamwork skills; 4.8. Leadership skills; 4.9. Project management skills; 4.10. Time management skills.
Description of the end products	Security of ICT systems is managed in an organization as per industry standards, and international and national legislations and regulations.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Human risk behaviour; 2. Cyber security attacks; 3. Industrial espionage; 4. Authentication and Authorization; 5. Data leakage prevention; 6. Critical information infrastructure protection; 7. Knowledge of information security risk management; 8. Knowledge of network security level protection; 9. Knowledge of network security management system; 10. Critical information infrastructure security requirements; 11. Protection of personally identifiable information; 12. Extend of responsibilities.

OCCUPATION	IT TECHNOLOGIST	**OCCUPATION CODE**	
DUTY TITLE	MANAGE COMPUTER SYSTEMS SECURITY IN AN ORGANIZATION	**DUTY NO.**	803
TASK TITLE	ASSESS SECURITY SYSTEM IN AN ORGANIZATION	**TASK NO.**	8034
PERFORMANCE CRITERIA	A person carrying out this task must be able to assess security system in an organization as per industry standards, and international and national legislations and regulations.		
RANGE STATEMENT	This task can be performed in a client's office. The following equipment and tools should be available: 1. ISO security guidelines; 2. Designers' manuals; 3. Manufacturers' manuals; 4. Networking tools; 5. High end computers; 6. Security assessment tools; 7. Security Laws; 8. Security Regulations; 9. Relevant equipment. This person shall work independently		

EVIDENCE REQUIREMENTS	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Perform security testing; 2. Interpret security test results; 3. Prepare report on systems security; 4. Observe health and safety precautions; 5. Clean workplace; 6. Store tools.	**Detailed knowledge about:** **1.0. Methods:** The person must be able to explain how to: 1.1. Plan security testing; 1.2. Communicate security testing; 1.3. Implement security testing; 1.4. Interpret test results; 1.5. Recommend Security Improvement; 1.6. Prepare security test report; 1.7. Present security test report. **2.0. Principles;** The person must be able to explain the principles of: 1.1. Information security management; 1.2. Physical security management. **3.0. Theories:** The person must be able to explain: 3.1. Ethical Hacking; 3.2. Penetration Testing; 3.3. Vulnerability Assessment; 3.4. Intrusion detection and prevention; 3.5. Threats hunting; 3.6. Incidents response. **4.0. Essential skills**

	8.1. Problem solving skills; 8.2. Critical thinking skills; 8.3. Analytical skills; 8.4. Communication skills; 8.5. Report writing skills; 8.6. Interpersonal skills; 8.7. Teamwork skills; 8.8. Leadership skills; 8.9. Project management skills; 8.10. Time management skills.
DESCRIPTION OF END PRODUCTS/SERVICE	Security system is assessed in an organization as per industry standards, and international and national legislations and regulations.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Human risk behaviour; 2. Cyber security attacks; 3. Industrial espionage; 4. AAA; 5. Firewall techniques; 6. VPN; 7. Intrusion detection and prevention; 8. WEB security; 9. Authentication and Authorization; 10. Data leakage prevention; 11. Critical information infrastructure protection; 12. Protection of personally identifiable information; 13. Extend of responsibilities.

OCCUPATION	IT TECHNOLOGIST	**OCCUPATION CODE**	
DUTY TITLE	MANAGE USER TECHNICAL SUPPORT SYSTEM IN AN ORGANIZATION	**DUTY NO.**	804
TASK TITLE	CREATE TECHNICAL SUPPORT SYSTEM IN AN ORGANIZATION	**TASK NO.**	8041
PERFORMANCE CRITERIA	A person carrying out this task must be able to create technical support system in an organization as per industry standards and national ICT support guidelines.		
RANGE STATEMENT	This task can be performed in a client's office. The following equipment and tools should be available: 1. Helpdesk manual; 2. Designers' manuals; 3. Manufacturers' manuals; 4. Computer; 5. Service Management tools; 6. Relevant equipment. This person shall work independently		

EVIDENCE REQUIREMENTS	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Identify technical support processes and procedures; 2. Set guiding principles and training principles for supporting customers; 3. Identify supporting technology routes; 4. Propose acquisition of the proposed technologies; 5. Propose parameters for hardware acquisitions; 6. Observe health and safety precautions; 7. Clean workplace; 8. Store tools.	**Detailed knowledge about:** **1.0.Methods:** The person must be able to explain how to: 1.1. Identify technical support processes and procedures; 1.2. Set guiding principles and training principles for supporting customers; 1.3. Identify supporting technology; 1.4. Propose acquisition of the proposed technologies; 1.5. Propose parameters for hardware acquisitions; 1.6. Present helpdesk technology support plan. **2.0. Principles;** The person must be able to explain the principles of: 2.1. Delivering ICT Services; 2.2. Supporting ICT Services. **3.0. Theories:** The person must be able to explain: 3.1. ICT Support desk; 3.2. ICT Services Management; 3.3. ICT Support processes; 3.4. Customer Management. **4.0. Essential skills** 5.1. Problem solving skills; 5.2. Critical thinking skills;

	5.3. Analytical skills; 5.4. Communication skills; 5.5. Report writing skills; 5.6. Interpersonal skills; 5.7. Teamwork skills; 5.8. Leadership skills; 5.9. Project management skills; 5.10. Time management skills.
DESCRIPTION OF END PRODUCTS/SERVICE	Technical support system is created in an organization as per industry standards and national ICT support guidelines.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. ICT Service Delivery Principles; 2. ICT Service Support Principles; 3. ICT Service Management Processes; 4. Customer care management; 5. Extend of responsibilities.

<table>
<tr><td>OCCUPATION</td><td>IT TECHNOLOGIST</td><td>OCCUPATION CODE</td><td></td></tr>
<tr><td>DUTY TITLE</td><td>MANAGE USER TECHNICAL SUPPORT SYSTEM IN AN ORGANIZATION</td><td>DUTY NO.</td><td>804</td></tr>
<tr><td>TASK TITLE</td><td>ASSIGN ROLES OF TECHNICAL SUPPORT TEAM IN AN ORGANIZATION</td><td>TASK NO.</td><td>8042</td></tr>
<tr><td>PERFORMANCE CRITERIA</td><td colspan="3">A person performing this task must be able to assign roles of technical support team in an organization as per industry standards and national ICT support guidelines.</td></tr>
<tr><td>RANGE STATEMENT</td><td colspan="3">This task can be performed in a workshop or in a client’s office.
The following equipment and tools should be available:
1. Operating Systems resource monitors;
2. System development guideline;
3. Computer system.
This person shall work under minimum supervision.</td></tr>
<tr><td colspan="4">EVIDENCE REQUIREMENTS</td></tr>
<tr><td colspan="2">PRACTICAL PERFORMANCE</td><td colspan="2">UNDERPINNING KNOWLEDGE</td></tr>
<tr><td colspan="2">The person performing this task must be able do the following:
1. Create levels of ICT support;
2. List levels of activities;
3. Conduct team configuration and task assignment;
4. Track and follow up the task process;
5. Escalate problem to higher levels;
6. Observe health and safety precautions;
7. Clean workplace;
8. Store tools.</td><td colspan="2">Detailed knowledge about:
1.0. Methods:
The person must be able to explain how to:
1.1. Create levels of IT support;
1.2. List levels of activities;
1.3. Conduct team configuration and task assignment;
1.4. Track and follow up the task process;
1.5. Conduct basic troubleshooting;
1.6. Escalate problem to higher levels;
1.7. Clean the workplace.

2.0. Principles:
The person must be able to explain the principles of:
2.1. Assigning roles of technical support team;
2.2. Conducting basic troubleshooting.

3.0. Theories:
The person must be able to explain:
3.1. Types of IT supports;
3.2. Escalating problem to higher levels.

4.0. Essential skills:
4.1 Problem solving skills;
4.2 Critical thinking skills;
4.3 Analytical skills;
4.4 Communication skills;
4.5 Report writing skills;
4.6 Interpersonal skills;
4.7 Teamwork skills;
4.8 Leadership skills;
4.9 Project management skills;</td></tr>
</table>

	4.10Time management skills.
DESCRIPTION OF END PRODUCTS/SERVICE:	Roles of technical support team are assigned in an organization as per industry standards and national ICT support guidelines.
CIRCUMSTANTIAL KNOWLEDGE:	**Detailed knowledge about:** 1. Safe handling of system software and business information system; 2. Safe handling of software; 3. Extent of responsibilities.

OCCUPATION	IT TECHNOLOGIST	**OCCUPATION CODE**	
DUTY TITLE	MANAGE USER TECHNICAL SUPPORT SYSTEM IN AN ORGANIZATION	**DUTY NO.**	804
TASK TITLE	ASSESS TECHNICAL SUPPORT SYSTEM IN AN ORGANIZATION	**TASK NO.**	8043
PERFORMANCE CRITERIA	A person carrying out this task must be able to assess technical support system in an organization as per industry standards and national ICT support guidelines.		
RANGE STATEMENT	This task can be performed in a client's office. The following equipment and tools should be available: 1. Helpdesk manual; 2. Designers' manuals; 3. Manufacturers' manuals; 4. Computer; 5. Service Management tools; 6. Relevant equipment. This person shall work independently		

EVIDENCE REQUIREMENTS	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Monitor performance of support team; 2. Review user feedback; 3. Evaluate the support team; 4. Produce weekly and monthly management reports on technical support tickets; 5. Observe health and safety precautions; 6. Clean workplace; 7. Store tools.	**Detailed knowledge about:** **1.0 Methods:** The person must be able to explain how to: 1.1. Interpret performance standards of support team; 1.2. Monitor performance of support team; 1.3. Review user feedback; 1.4. Evaluate the support team; 1.5. Produce weekly and monthly management reports on technical support tickets. **2.0 . Principles;** The person must be able to explain the principles guiding: 2.1. Evaluating ICT Services delivery and support; 2.2. Monitoring performance of support team; 2.3. ICT Service Delivery; 2.4. ICT Service Support; 2.5. Familiarity with ICT user scenarios. **3.0 Theories:** The person must be able to explain: 3.1. ICT Support desk; 3.2. ICT Services Management; 3.3. ICT Support processes; 3.4. Customer Management.

	4.0 Essential skills 4.1 Problem solving skills; 4.2 Critical thinking skills; 4.3 Analytical skills; 4.4 Communication skills; 4.5 Report writing skills; 4.6 Interpersonal skills; 4.7 Teamwork skills; 4.8 Leadership skills; 4.9 Project management skills; 4.10 Time management skills; 4.11 Customer care management.
Description on the end products	Assessment of technical support system is conducted in an organization as per industry standards and national ICT support guidelines.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. ICT Service Management Processes; 2. Extend of responsibilities.

OCCUPATION	IT TECHNOLOGIST	**OCCUPATION CODE**	
DUTY TITLE	MANAGE COMPLEX COMPUTER NETWORKS IN AN ORGANIZATION	**DUTY NO.**	805
TASK TITLE	CONFIGURE COMPLEX COMPUTER NETWORKS IN AN ORGANIZATION	**TASK NO.**	8051
PERFORMANCE CRITERIA	A person carrying out this task must be able to configure complex computer networks in an organization as per industry standards and national ICT guidelines.		
RANGE STATEMENT	This task can be performed in a workshop or in a client's office. The following equipment and tools should be available: 1. Designers' manuals; 2. Computer; 3. Network tools kit; 4. Technician toolkit; 5. Relevant software tools; 6. Network devices; 7. Other relevant equipment; 8. Static-free workbench. This person shall work independently		

EVIDENCE REQUIREMENTS

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Identify the business requirements based on the business scenario; 2. Identify the required network devices and build the network topology according to the requirements; 3. Customize the settings of relevant network devices; 4. Check the settings; 5. Verify the effectiveness of the settings; 6. Observe health and safety precautions; 7. Clean workplace; 8. Store tools.	**Detailed knowledge about:** **1.0. Methods:** The person must be able to explain how to: 1.1. Identify business requirements; 1.2. Identify the required network devices and build the network topology; 1.3. Customize the settings of relevant network devices; 1.4. Check the custom settings; 1.5. Check the settings of network devices; 1.6. Change the settings of network devices; 1.7. Verify the effectiveness of the settings. **2.0. Principle** The person must be able to explain the principles of: 2.1. Customize the settings of the involved network devices; 2.2. View the settings of network devices; 2.3. Change the settings of network devices; 2.4. Verify the network settings. **3.0. Theories:** The person must be able to explain: 3.1. Types of networks; 3.2. Network monitoring methods and their steps; 3.3. Types of network monitoring tools and their

	functions. **4.0. Essential skills** 4.1 Analytical skills; 4.2 Problem solving skills; 4.3 Critical thinking skills; 4.4 Communication skills; 4.5 Report writing skills; 4.6 Interpersonal skills; 4.7 Teamwork skills; 4.8 Leadership skills; 4.9 Project management skills; 4.10Time management skills.
DESCRIPTION OF END PRODUCTS/SERVICE	Complex computer networks are configured in an organization as per industry standards and national ICT guidelines.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Safe handling of equipment and tools; 2. Extent of responsibilities.

OCCUPATION	IT TECHNOLOGIST	**OCCUPATION CODE**	
DUTY TITLE	MANAGE COMPLEX COMPUTER NETWORKS IN AN ORGANIZATION	**DUTY NO.**	805
TASK TITLE	UPGRADE COMPLEX COMPUTER NETWORKS IN AN ORGANIZATION	**TASK NO.**	8052
PERFORMANCE CRITERIA	A person carrying out this task must be able to upgrade complex computer networks in an organization as per industry standards and national ICT guidelines.		
RANGE STATEMENT	This task can be performed in a workshop or in a client's office. The following equipment and tools should be available: 1. Designers' manuals; 2. Computer; 3. Network tools kit; 4. Network diagnostic tools; 5. Technician toolkit; 6. Other relevant equipment; 7. Static-free workbench. This person shall work independently		

EVIDENCE REQUIREMENTS	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Identify the needs for network upgrades; 2. Identify the network device to be upgraded; 3. Install the upgraded network devices; 4. Customize the settings of the upgraded device; 5. Test the upgraded network; 6. Observe health and safety precautions when performing the task; 7. Clean workplace; 8. Store tools.	**Detailed knowledge about:** **1.0. Methods:** The person must be able to explain how to: 1.1. Install, connect and debug network devices; 1.2. Install new versions of firmware; 1.3. Change the configuration of network devices; 1.4. Disconnect the network devices; 1.5. Test the upgraded service-based software. **2.0. Principle** The person must be able to explain the principles of: 2.1. Upgrading network devices; 2.2. Upgrading firmware. **3.0. Theories:** The person must be able to explain: 3.1. Types of networks; 3.2. Network techniques; 3.3. Firmware's. **4.0. Essential skills** 4.1. Analytical skills; 4.2. Problem solving skills; 4.3. Critical thinking skills; 4.4. Communication skills; 4.5. Report writing skills; 4.6. Interpersonal skills;

	4.7. Teamwork skills; 4.8. Leadership skills; 4.9. Project management skills; 4.10. Time management skills.
DESCRIPTION OF END PRODUCTS/SERVICE	Complex computer networks is upgraded in an organization as per industry standards and national ICT guidelines.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Safe handling of equipment and tools; 2. Safe handling of network devices; 3. Safe handling of software; 4. Extent of responsibilities.

OCCUPATION	IT TECHNOLOGIST	**OCCUPATION CODE**	
DUTY TITLE	MANAGE COMPLEX COMPUTER NETWORKS IN AN ORGANIZATION	**DUTY NO.**	805
TASK TITLE	TROUBLESHOOT COMPLEX COMPUTER NETWORKS IN AN ORGANIZATION	**TASK NO.**	8053
PERFORMANCE CRITERIA	A person carrying out this task must be able to troubleshoot complex computer networks in an organization as per industry standards, national ICT guidelines and designers' manuals.		
RANGE STATEMENT	This task can be performed in a workshop or in a client's office. The following equipment and tools should be available: 1. Manufacturers' manuals; 2. Computer; 3. Network tools kit; 4. Network diagnostic tools; 5. Relevant software tools; 6. Relevant equipment; 7. Static-free workbench. This person shall work independently.		

EVIDENCE REQUIREMENTS	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Identify network diagnostic tools; 2. Analyze fault; 3. Run diagnostic tests; 4. Interpret diagnostic reports; 5. Repair the faulty computer network; 6. Test the repaired network; 7. Prepare computer network repair reports; 8. Observe health and safety precautions when performing tasks; 9. Clean workplace; 10. Store tools.	**Detailed knowledge about:** **1.0. Methods:** The person must be able to explain how to: 1.1. Identify network diagnostic tools; 1.2. Analyze fault; 1.3. Run diagnostic tests; 1.4. Interpret diagnostic reports; 1.5. Repair the faulty computer network; 1.6. Test the repaired network; 1.7. Prepare computer network repair reports. **2.0. Principle** The person must be able to explain the principles of: 2.1 Network troubleshooting; 2.2 Changing the settings of network devices; 2.3 Settings of network devices. **3.0. Theories:** The person must be able to explain: 3.1. Types of networks; 3.2. Network troubleshooting methods and their steps; 3.3. Types of networks diagnostic tools and their functions. **4.0. Essential skills** 4.1 Analytical skills;

	4.2 Problem solving skills; 4.3 Critical thinking skills; 4.4 Communication skills; 4.5 Report writing skills; 4.6 Interpersonal skills; 4.7 Teamwork skills; 4.8 Leadership skills; 4.9 Project management skills; 4.10Time management skills.
Description on the end products	Complex computer networks are troubleshooted and functioning in an organization as per industry standards, national ICT guidelines and designers' manuals.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Safe handling of equipment and tools; 2. Extend of responsibilities.

OCCUPATION	IT TECHNOLOGIST	**OCCUPATION CODE**	
DUTY TITLE	MANAGE COMPLEX COMPUTER NETWORKS IN AN ORGANIZATION	**DUTY NO.**	805
TASK TITLE	SUPERVISE COMPLEX COMPUTER NETWORKS IN AN ORGANIZATION	**TASK NO.**	8054
PERFORMANCE CRITERIA	A person carrying out this task must be able to supervise complex computer networks in an organization as per industry standards and instruction manuals.		
RANGE STATEMENT	This task can be achieved in a workshop or in a client's office. The following equipment and tools should be available: 1. Manufacturers' manuals; 2. Computer; 3. Network tools kit;; 4. Network diagnostic tool 5. Relevant software tools; 6. Other relevant equipment; 7. Static-free workbench. This person shall work independently.		

EVIDENCE REQUIREMENTS	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Identify and use network monitoring tools; 2. Create network performance benchmarks; 3. Network performance monitoring and handling; 4. Network fault monitoring and handling; 5. Network security incident monitoring and handling; 6. Create network monitoring reports; 7. Observe health and safety precautions; 8. Clean workplace; 9. Store tools.	**Detailed knowledge about:** **1.0. Methods:** The person must be able to explain how to: 1.1. Collect data on the network; 1.2. Measure performance; 1.3. Interpret the measurement results of monitoring tools; 1.4. Create network monitoring reports. **2.0. Principle** The person must be able to explain the principles of network monitoring **3.0. Theories:** The person must be able to explain: 3.1 Types of networks; 3.2 Network monitoring methods and their steps; 3.3 Types of network monitoring tools and their functions. **4.0. Essential skills** 4.1 Problem solving skills; 4.2 Critical thinking skills; 4.3 Analytical skills; 4.4 Communication skills; 4.5 Report writing skills; 4.6 Interpersonal skills;

	4.7 Teamwork skills; 4.8 Leadership skills; 4.9 Project management skills; 4.10 Time management skills.
DESCRIPTION OF END PRODUCTS/SERVICE	Complex computer networks are supervised in an organization as per industry standards, national ICT guidelines and instruction manuals.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Safe handling of equipment and tools; 2. Extent of responsibilities.

OCCUPATION	IT TECHNOLOGIST	**OCCUPATION CODE**	
DUTY TITLE	INTRODUCE EMERGING ICT SOLUTIONS IN AN ORGANIZATION	**DUTY NO.**	806
TASK TITLE	RESEARCH ON NEW ICT SOLUTIONS IN AN ORGANIZATION	**TASK NO.**	8061
PERFORMANCE CRITERIA	A person carrying out this task must be able to conduct research on new ICT solutions in an organization as per industry standards and national ICT guidelines.		
RANGE STATEMENT	This task can be achieved in a workshop or in a client's office. The following equipment and tools should be available: 1. Computer; 2. Network tools kit; 3. Technician toolkit; 4. Relevant software tools; 5. Relevant equipment. This person shall work independently.		

EVIDENCE REQUIREMENTS	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Study new ICT solutions and analyze development prospects; 2. Identify business needs; 3. Appraise new ICT solutions 4. Prepare assessment reports; 5. Observe health and safety precautions; 6. Clean workplace; 7. Store tools.	**Detailed knowledge about:** **1.0. Methods:** The person must be able to explain how to: 1.1. Study new ICT solutions; 1.2. Identify business needs; 1.3. Appraise new ICT solutions; 1.4. Prepare assessment reports. **2.0. Principle** The person must be able to explain the principles of: 2.1. Technology adoption; 2.2. Researching for new ICT solutions; 2.3. Installing computer hardware and software. **3.0. Theories:** The person must be able to explain: 3.1 Network ICT solutions and their features; 3.2 Research methods. **4.0. Essential skills** 4.1 Problem solving skills; 4.2 Critical thinking skills; 4.3 Analytical skills; 4.4 Communication skills; 4.5 Report writing skills; 4.6 Interpersonal skills; 4.7 Teamwork skills; 4.8 Leadership skills; 4.9 Project management skills;

	4.10Time management skills.
DESCRIPTION OF END PRODUCTS/SERVICE	New ICT solutions are researched in an organization as per industry standards.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Program knowledge in communications engineering, mobile Internet, IoT, cloud computing, blockchain and other emerging techniques; 2. Safe handling of equipment and tools; 3. Safe handling of network devices; 4. Safe handling of software; 5. Extent of responsibilities.

OCCUPATION	IT TECHNOLOGIST	**OCCUPATION CODE**	
DUTY TITLE	INTRODUCE EMERGING ICT SOLUTIONS IN AN ORGANIZATION	**DUTY NO.**	806
TASK TITLE	PLAN INTRODUCTION OF NEW ICT SOLUTIONS IN AN ORGANIZATION	**TASK NO.**	8062
PERFORMANCE CRITERIA	A person carrying out this task must be able to plan introduction of new ICT solutions in an organization as per industry standards and national ICT guidelines.		
RANGE STATEMENT	This task can be achieved in a workshop or in a client's office. The following equipment and tools should be available: 1. Computer; 2. Network tools kit; 3. Technician toolkit; 4. Relevant software tools; 5. Relevant equipment. This person shall work independently.		

EVIDENCE REQUIREMENTS	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Interpret research findings on new ICT solutions; 2. Activities and resources required to roll out new ICT solutions; 3. Timeline of activities for the rollout of new ICT solutions; 4. Milestones for the rollout of new ICT solutions; 5. Observe health and safety precautions; 6. Clean workplace; 7. Store tools.	**Detailed knowledge about:** **1.0. Methods:** This person must be able to explain how to: 1.1. Interpret research findings on new ICT solutions; 1.2. Outline activities required to rollout new ICT solutions; 1.3. Set timelines for the activities required to rollout new ICT solutions; 1.4. Outline milestones for rolling out new ICT solutions. **2.0. Principle** The person must be able to explain the principles of: 2.1. Technology adoption; 2.2. Planning of ICT solutions launching. **3.0. Theories:** The person must be able to explain: 3.1 Technology rollout methods; 3.2 Planning. **4.0. Essential skills** 4.1 Problem solving skills; 4.2 Critical thinking skills; 4.3 Analytical skills; 4.4 Communication skills; 4.5 Report writing skills; 4.6 Interpersonal skills; 4.7 Teamwork skills;

	4.8 Leadership skills; 4.9 Project management skills; 4.10Time management skills.
DESCRIPTION OF END PRODUCTS/SERVICE	Introduction of new ICT solutions is planned in an organization as per industry standards and national ICT guidelines.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Safe handling of equipment and tools; 2. Safe handling of network devices; 3. Safe handling of software; 4. Extent of responsibilities.

OCCUPATION	IT TECHNOLOGIST	**OCCUPATION CODE**	
DUTY TITLE	INTRODUCE EMERGING ICT SOLUTIONS IN AN ORGANIZATION	**DUTY NO.**	806
TASK TITLE	CONDUCT TRAINING ON NEW ICT SOLUTIONS IN AN ORGANIZATION	**TASK NO.**	8063
PERFORMANCE CRITERIA	A person carrying out this task must be able to conduct training on new ICT solutions in an organization as per industry standards and national ICT guidelines.		
RANGE STATEMENT	This task can be achieved in a workshop or in a client's office. The following equipment and tools should be available: 1. Computer; 2. Network tools kit; 3. Technician toolkit; 4. Relevant software tools; 5. Relevant equipment. This person shall work independently		

EVIDENCE REQUIREMENTS	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Identify knowledge and skills gap; 2. Prepare training program; 3. Prepare training materials; 4. Run training sessions; 5. Create training report; 6. Observe health and safety precautions; 7. Clean workplace; 8. Store tools.	**Detailed knowledge about:** **1.0. Methods:** This person must be able to explain how to: 1.1. Identify training needs; 1.2. Set training objectives; 1.3. Develop training plans; 1.4. Prepare for training; 1.5. Training implementation and coordination; 1.6. Training program assessment and summary. **2.0. Principle** The person must be able to explain the principles of. conducting professional training **3.0. Theories:** The person must be able to explain: 3.1 Training delivery methods; 3.2 Types of learners. **4.0. Essential skills** 4.1. Problem solving skills; 4.2. Critical thinking skills; 4.3. Analytical skills; 4.4. Communication skills; 4.5. Report writing skills; 4.6. Interpersonal skills; 4.7. Teamwork skills; 4.8. Leadership skills; 4.9. Project management skills;

	4.10. Time management skills.
DESCRIPTION OF END PRODUCTS/SERVICE	Training on new ICT solutions is conducted in an organization as per industry standards and national ICT guidelines.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Course design; 2. Teaching skills; 3. Safe handling of equipment and tools; 4. Safe handling of network devices; 5. Safe handling of software; 6. Extent of responsibilities.

OCCUPATION	IT TECHNOLOGIST	**OCCUPATION CODE**	
DUTY TITLE	MANAGE CLOUD COMPUTING BASED SERVICES IN AN ORGANIZATION	**DUTY NO.**	807
TASK TITLE	INTEGRATE CLOUD COMPUTING INFRASTRUCTURE IN AN ORGANIZATION	**TASK NO.**	8071
PERFORMANCE CRITERIA	A person performing this task must be able to integrate cloud computing infrastructure in an organization as per industry standards and national ICT system development guidelines.		
RANGE STATEMENT	This task can be performed in government or enterprise office environments, or production environments. The following equipment and tools should be available: 1. Physical or virtual servers; 2. Computer operating system; 3. Instruction manual. This person shall work independently.		

EVIDENCE REQUIREMENTS

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Identify cloud computing platforms; 2. Plan the cloud computing platform system architecture based on the application scenario; 3. Integrate the cloud computing infrastructure according to the system architecture and build the cloud computing platform; 4. Extend cloud computing infrastructure; 5. Observe health and safety precautions; 6. Clean workplace; 7. Store tools.	**Detailed knowledge about:** **1.0. Methods:** The person must be able to explain how to: 1.1. Identify cloud computing platforms; 1.2. Plan the cloud computing platform system architecture based on the application scenario; 1.3. Integrate the cloud computing infrastructure according to the system architecture and build the cloud computing platform; 1.4. Extend cloud computing infrastructure; 1.5. Create cloud computing applications and services; 1.6. Implement cloud integration; 1.7. Clean work area. **2.0. Principles:** The person must be able to explain the principles of: 2.1. Assigning roles of technical support team; 2.2. Conducting basic troubleshooting. **3.0. Theories:** The person must be able to explain: 3.1. Theories of virtualization technology; 3.2. Theories of cloud computing characteristics, deployment models, service models; 3.3. Theories related to distributed systems and clusters; 3.4. How to use cloud computing platforms to manage consoles.

	4.0. Essential skills: 4.1 Problem solving skills; 4.2 Critical thinking skills; 4.3 Analytical skills; 4.4 Communication skills; 4.5 Report writing skills; 4.6 Interpersonal skills; 4.7 Teamwork skills; 4.8 Leadership skills; 4.9 Project management skills; 4.10Time management skills.
DESCRIPTION OF END PRODUCTS/SERVICE	Cloud computing infrastructure is integrated and functioning in an organization as per industry standards and national ICT system development guidelines.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Safe handling of system software and business information system; 2. Safe handling of software; 3. Extent of responsibilities.

OCCUPATION	IT TECHNOLOGIST	**OCCUPATION CODE**	
DUTY TITLE	MANAGE CLOUD COMPUTING BASED SERVICES IN AN ORGANIZATION	**DUTY NO.**	807
TASK TITLE	CONFIGURE AND MANAGE CLOUD COMPUTING SERVICES IN AN ORGANIZATION	**TASK NO.**	8072
PERFORMANCE CRITERIA	A person carrying out this task must be able to configure and manage cloud computing services in an organization as per industry standards, national ICT guidelines and instruction manuals.		
RANGE STATEMENT	This task can be achieved in government or enterprise office environments, or production environments. The following equipment and tools should be available: 1. Instruction manuals; 2. Cloud infrastructure; 3. Technician toolkit; 4. Relevant software tools; 5. Relevant equipment. This person shall work independently		

EVIDENCE REQUIREMENTS	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Identify deployment cloud platform services; 2. Review security and compliance policies to cloud platform; 3. Test cloud computing services; 4. Deploy cloud computing services; 5. Observe health and safety precautions; 6. Clean workplace; 7. Store tools.	**Detailed knowledge about:** **1.0. Methods:** The person must be able to explain how to: 1.1. Identify deployment cloud platform services; 1.2. Review security and compliance policies to cloud platform; 1.3. Test cloud computing services; 1.4. Deploy cloud computing services. **2.0. Principles;** The person must be able to explain the principles of: 2.1. Configuring and managing cloud computing services. **3.0. Theories:** The person must be able to explain: 3.1. Scheduling computing resources and maintaining the life cycle of a cloud host; 3.2. Block storage, object storage and public storage phases in cloud computing, connection of cloud computing platform to public storage; 3.3. Cloud database and distributed database deployment; 3.4. Configuring network for cloud computing

	platform, VPC exclusive private network services, and network security group. **4.0. Essential skills** 4.1 Problem solving skills; 4.2 Critical thinking skills; 4.3 Analytical skills; 4.4 Communication skills; 4.5 Report writing skills; 4.6 Interpersonal skills; 4.7 Teamwork skills; 4.8 Leadership skills; 4.9 Project management skills; 4.10Time management skills.
DESCRIPTION OF END PRODUCTS/SERVICE	Cloud computing services are configured and managed and functioning in an organization as per industry standards, national ICT guidelines and instruction manuals.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Safe handling of equipment and tools; 2. Safe handling of network devices; 3. Safe handling of software; 4. Extent of responsibilities.

OCCUPATION	IT TECHNOLOGIST	**OCCUPATION CODE**	
DUTY TITLE	MANAGE CLOUD COMPUTING BASED SERVICES IN AN ORGANIZATION	**DUTY NO.**	807
TASK TITLE	DEPLOY CLOUD COMPUTING BASED BUSINESS SYSTEMS IN AN ORGANIZATION	**TASK NO.**	8073
PERFORMANCE CRITERIA	A person carrying out this task must be able to configure cloud computing applications and services in an organization as per industry standards, national ICT guidelines and instruction manuals.		
RANGE STATEMENT	This task can be achieved in a workshop or in a client's office. The following equipment and tools should be available: 1. Instruction manuals; 2. Cloud computing infrastructure; 3. Cloud computing platform; 4. Technician toolkit; 5. Relevant software tools; 6. Relevant equipment. This person shall work independently		

EVIDENCE REQUIREMENTS

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Identify business requirements; 2. Plan the system cluster architecture based on the business system requirements; 3. Select and configure the appropriate cloud computing service components based on the system cluster architecture; 4. Deploy the business system in the cloud; 5. Test the cloud application system; 6. Governance and management of cloud-based application systems; 7. Observe health and safety precautions; 8. Clean workplace; 9. Store tools.	**Detailed knowledge about:** **1.0. Methods:** The person must be able to explain how to: 1.1. Plan the system cluster architecture; 1.2. Select and configure the appropriate cloud computing service components based on the system cluster architecture; 1.3. Deploy the business system in the cloud; 1.4. Test the cloud application system; 1.5. Governance and management of cloud-based application systems. **2.0. Principles;** The person must be able to explain the principles of: 2.1. Configuring cloud computing applications; 2.2. Data backup. **3.0. Theories:** The person must be able to explain: 3.1. Server cluster architecture planning; 3.2. Building services related to the application system commonly used; 3.3. Rapid deployment of applications using container technology; 3.4. How to maintain, manage and upgrade cloud-

	based business systems and modify related service configurations according to demand. **4.0. Essential skills** 4.1. Problem solving skills; 4.2. Critical thinking skills; 4.3. Analytical skills; 4.4. Communication skills; 4.5. Report writing skills; 4.6. Interpersonal skills; 4.7. Teamwork skills; 4.8. Leadership skills; 4.9. Project management skills; 4.10. Time management skills.
DESCRIPTION OF END PRODUCTS/SERVICE	Cloud computing-based business systems are deployed and functioning in an organization as per industry standards, national ICT guidelines and instruction manuals.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Safe handling of equipment and tools; 2. Safe handling of network devices; 3. Safe handling of software; 4. Extent of responsibilities.

OCCUPATION	IT TECHNOLOGIST	**OCCUPATION CODE**	
DUTY TITLE	MANAGE CLOUD COMPUTING BASED SERVICES IN AN ORGANIZATION	**DUTY NO.**	807
TASK TITLE	MONITOR CLOUD COMPUTING APPLICATIONS AND SERVICES IN AN ORGANIZATION	**TASK NO.**	8074
PERFORMANCE CRITERIA	A person carrying out this task must be able to monitor cloud computing applications and services in an organization as per industry standards, national ICT guidelines and instruction manuals.		
RANGE STATEMENT	This task can be achieved in government or enterprise office environments, or production environments. The following equipment and tools should be available: 1. Instruction manuals; 2. Computer; 3. Network tools kit; 4. Technician toolkit; 5. Relevant software tools; 6. Relevant equipment. This person shall work independently		

EVIDENCE REQUIREMENTS	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Identify required monitoring tools; 2. Develop monitoring strategies; 3. Analyze the collected data indicators of applications and services; 4. Analyze and troubleshoot the system based on monitoring logs; 5. Create performance monitoring report of cloud computing applications and services; 6. Observe health and safety precautions; 7. Clean workplace; 8. Store tools.	**Detailed knowledge about:** **1.0. Methods:** The person must be able to explain how to: 1.1. Identify required monitoring tools; 1.2. Develop monitoring strategies; 1.3. Analyze the collected data indicators of applications and services; 1.4. Analyze and troubleshoot the system based on monitoring logs; 1.5. Create performance monitoring report of cloud computing applications and. **2.0. Principle** The person must be able to explain the principles of: 2.1. Monitoring cloud computing applications and services; 2.2. Analyzing the collected data indicators of applications and services. **3.0. Theories:** The person must be able to explain: 3.1 Monitoring management scope and basic architecture of monitoring;

	3.2 Common monitoring solutions; 3.3 Common exception handling; 3.4 System troubleshooting; 3.5 System optimization. **4.0. Essential skills** 4.1. Problem solving skills; 4.2. Critical thinking skills; 4.3. Analytical skills; 4.4. Communication skills; 4.5. Report writing skills; 4.6. Interpersonal skills; 4.7. Teamwork skills; 4.8. Leadership skills; 4.9. Project management skills; 4.10. Time management skills.
DESCRIPTION OF END PRODUCTS/SERVICE	Cloud computing applications and services are monitored in an organization as per industry standards, national ICT guidelines and instruction manuals.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Safe handling of equipment and tools 2. Safe handling of network devices 3. Safe handling of software 4. Extent of responsibilities

OCCUPATION	IT TECHNOLOGIST	**OCCUPATION CODE**	
DUTY TITLE	EVALUATE SYSTEM REQUIREMENTS IN AN ORGANIZATION	**DUTY NO.**	808
TASK TITLE	REVIEW SYSTEM REQUIREMENTS SPECIFICATION (SRS) IN AN ORGANIZATION	**TASK NO**	8081
PERFORMANCE CRITERIA	A person carrying out this task must be able to review system requirements specifications in an organization as per industry standards and national ICT guidelines.		
RANGE STATEMENT	This task can be achieved in the office environment or at customer's site. The following items and tools must be available: 1. Computer 2. Institution's manual 3. Business processes modelling tools 4. Process design tools 5. Presentation tools This person shall work independently.		

EVIDENCE REQUIREMENTS

Practical Performance	**Underpinning Knowledge**
The person performing this task must be able to do the following: 1. Interpret the norm of analysis on the system requirements 2. Validate the specified requirements 3. Enterprise defined requirements 4. Observe health and safety precautions 5. Clean workplace 6. Store tools	**Detailed knowledge about:** **1.0. Methods:** The person must be able to explain how to: 1.1. Interpret the norm of analysis on the system requirements 1.2. Validate the specified requirements 1.3. Enterprise defined requirements **2.0. Principles:** The person must be able to explain the principles of: 2.1. Systems requirements 2.2. User requirements 2.3. Requirements engineering **3.0. Theories**: The person must be able to explain what is: 3.1. Functional requirements 3.2. Non-Functional requirements 3.3. Systems Design **4.0. Essential Skills:** 4.1. Problem solving skills 4.2. Critical thinking skills 4.3. Analytical skills 4.4. Communication skills 4.5. Report writing skills 4.6. Interpersonal skills

	4.7. Teamwork skills 4.8. Leadership skills 4.9. Project management skills 4.10. Time management skills
DESCRIPTION OF END PRODUCTS/SERVICE	System requirements specification is reviewed in an organization as per industry standards and national ICT guidelines.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Business communications 2. Information analysis 3. Extend of responsibilities

OCCUPATION	IT TECHNOLOGIST	**OCCUPATION CODE**	
DUTY TITLE	EVALUATE SYSTEM REQUIREMENTS IN AN ORGANIZATION	**DUTY NO.**	808
TASK TITLE	PREPARE A CHANGE MANAGEMENT PLAN IN AN ORGANIZATION	**TASK NO.**	8082
PERFORMANCE CRITERIA	A person carrying out this task must be able to prepare a change management plan in an organization as per industry standards and national ICT guidelines.		
RANGE STATEMENT	This task can be achieved in the office environment or at customer's site. The following items and tools must be available: 1. Computer; 2. Description of business organization; 3. Change management software tools; 4. Presentation tools. This person shall work independently.		

EVIDENCE REQUIREMENTS	
Practical Performance	**Underpinning Knowledge**
The person performing this task must be able to do the following: 1. Identify roles impacted by the change; 2. Craft change objectives; 3. Outline change strategies development; 4. Identify required resources; 5. Observe health and safety precautions; 6. Clean workplace; 7. Store tools.	**Detailed knowledge about:** **1.0. Methods:** The person must be able to explain how to: 1.1. Identify roles impacted by the change; 1.2. Craft change objectives; 1.3. Outline change strategies development; 1.4. Identify required resources. **2.0. Principles:** The person must be able to explain the principles of: 2.1. Change plans; 2.2. Change Implementation; 2.3. Change communication; 2.4. Risk management; 2.5. Costs benefit analysis; 2.6. Resources management; 2.7. Business communications. **3.0. Theories**: The person must be able to explain how to: 3.1. Assess the change; 3.2. Analyze and understand the change; 3.3. Calculate change benefits; 3.4. Identify changes; 3.5. Understand differences in descriptions from different cultural contexts; 3.6. Maintain efficient communication; 3.7. Communicate continuously and clearly; 3.8. Develop change implementation strategies.

	4.0. Essential Skills: 4.1. Problem solving skills; 4.2. Critical thinking skills; 4.3. Analytical skills; 4.4. Communication skills; 4.5. Report writing skills; 4.6. Interpersonal skills; 4.7. Teamwork skills; 4.8. Leadership skills; 4.9. Project management skills; 4.10. Time management skills.
DESCRIPTION OF END PRODUCTS/SERVICE	Change management plan is prepared in an organization as per industry standards and national ICT guidelines.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Communications skills; 2. Information analysis; 3. Other related responsibilities.

OCCUPATION	IT TECHNOLOGIST	**OCCUPATION CODE**	
DUTY TITLE	EVALUATE DESIGNS OF BUSINESS INFORMATION SYSTEMS IN AN ORGANIZATION	**DUTY NO.**	809
TASK TITLE	REVIEW SYSTEM DESIGN DOCUMENT (SDD) IN AN ORGANIZATION	**TASK NO.**	8091
PERFORMANCE CRITERIA	A person carrying out this task must be able to review System Design Document (SDD) in an organization as per industry standards and national ICT guidelines.		
RANGE STATEMENT	This task can be achieved in the office environment or at customer's site. The following items and tools must be available: 1. Computer; 2. Institution's manual; 3. System designing software tools; 4. Presentation tools. This person shall work independently.		

EVIDENCE REQUIREMENTS	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Interpret the system design documentation; 2. Optimize the system design documentation; 3. Observe health and safety precautions; 4. Clean workplace; 5. Store tools.	**Detailed knowledge about:** **1.0. Methods:** The person must be able to explain how to: 1.1. Interpret the system design documentation; 1.2. Optimize the system design documentation. **2.0. Principles:** The person must be able to explain the principles of: 2.1. Systems design; 2.2. Design optimization. **3.0. Theories:** The person must be able to explain how to: 3.1. Design and redesign business processes; 3.2. Understand system architecture; 3.3. Prepare system architecture; 3.4. Model data, events and business rules; 3.5. Relate applications, services & components. **4.0. Essential Skills:** 4.1. Problem solving skills; 4.2. Critical thinking skills; 4.3. Analytical skills; 4.4. Communication skills; 4.5. Report writing skills; 4.6. Interpersonal skills; 4.7. Teamwork skills; 4.8. Leadership skills; 4.9. Project management skills;

	4.10. Time management skills.
DESCRIPTION OF END PRODUCTS/SERVICE	System Design Document (SDD) is reviewed in an organization as per industry standards and national ICT guidelines.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Business operations; 2. Information analysis; 3. Extend of responsibilities.

OCCUPATION	IT TECHNOLOGIST	OCCUPATION CODE	
DUTY TITLE	EVALUATE DESIGNS OF BUSINESS INFORMATION SYSTEMS IN AN ORGANIZATION	**DUTY NO.**	809
TASK TITLE	ASSESS DESIGNS OF BUSINESS INFORMATION SYSTEMS IN AN ORGANIZATION	**TASK NO.**	8092
PERFORMANCE CRITERIA	A person carrying out this task must be able to assess designs of business information systems in an organization as per industry standards and national ICT guidelines.		
RANGE STATEMENT	This task can be achieved in the office environment or at customer's site. The following items and tools must be available: 1. Computer; 2. Institution's manual; 3. System designing software tools; 4. Presentation tools. This person shall work independently.		

EVIDENCE REQUIREMENTS

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Explain the design of software modules and components in the context of the business; 2. Investigate the impact of the design on business value and optimize the system design; 3. Observe health and safety precautions; 4. Clean workplace; 5. Store tools.	**Detailed knowledge about:** **1.0. Methods:** The person must be able to explain how to: 1.1. Explain the design of software modules and components in the context of the business; 1.2. Investigate the impact of the design on business value and optimize the system design. **2.0. Principles:** The person must be able to explain the principles of: 2.1. Preparations of business cases; 2.2. Software specifications; 2.3. Business systems designs. **3.0. Theories:** The person must be able to explain how to: 3.1. Business systems analysis; 3.2. Systems requirements specifications; 3.3. Cost benefit analysis. **4.0. Essential Skills:** 4.1. Problem solving skills;

	4.2. Critical thinking skills; 4.3. Analytical skills; 4.4. Communication; 4.5. Communication skills; 4.6. Report writing skills; 4.7. Interpersonal skills; 4.8. Teamwork skills; 4.9. Leadership skills; 4.10. Project management skills; 4.11. Time management skills.
DESCRIPTION OF END PRODUCTS/SERVICE	Designs of business information systems are assessed in an organization as per industry standards and national ICT guidelines.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Business processes; 2. Information analysis; 3. Extend of responsibilities.

OCCUPATION	IT TECHNOLOGIST	OCCUPATION CODE	
DUTY TITLE	EVALUATE DESIGNS OF BUSINESS INFORMATION SYSTEMS IN AN ORGANIZATION	**DUTY NO.**	809
TASK TITLE	COMMUNICATE DESIGNS OF BUSINESS INFORMATION SYSTEMS IN AN ORGANIZATION	**TASK NO.**	8093
PERFORMANCE CRITERIA	A person carrying out this task must be able to communicate designs of business information systems in an organization as per industry standards and national ICT guidelines.		
RANGE STATEMENT	This task can be achieved in the office environment or at customer's site. The following items and tools must be available: 1. Computer; 2. Institution's manual; 3. System designing software tools; 4. Presentation tools. This person shall work independently.		

EVIDENCE REQUIREMENTS

Practical Performance	**Underpinning Knowledge**
The person performing this task must be able to do the following: 1. Familiarize with the content of the system design documents; 2. Clearly describe the business and applications of the system; 3. Organize the communication on information systems and optimize business processes; 4. Observe health and safety precautions; 5. Clean workplace; 6. Store tools.	**Detailed knowledge about:** **1.0. Methods:** The person must be able to explain how to: 1.1. Familiarize with the content of the system design documents; 1.2. Clearly describe the business and applications of the system; 1.3. Organize the communication of information systems and optimize business processes. **2.0. Principles:** The person must be able to explain the principles of: 2.1. Systems design; 2.2. Design communication. **3.0. Theories:** The person must be able to explain how to: 3.1. Design and redesign business processes; 3.2. Stakeholder's communications; 3.3. Business needs, processes and structures; 3.4. Relate applications, services & components. **4.0. Essential Skills:** 4.1. Problem solving skills; 4.2. Critical thinking skills; 4.3. Analytical skills; 4.4. Communication skills; 4.5. Report writing skills;

	4.6. Interpersonal skills; 4.7. Teamwork skills; 4.8. Leadership skills; 4.9. Project management skills; 4.10. Time management skills.
DESCRIPTION OF END PRODUCTS/SERVICE	Designs of business information systems are communicated in an organization as per industry standards and national ICT guidelines.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Business operations; 2. Information analysis; 3. Extend of responsibilities.

OCCUPATION	IT TECHNOLOGIST	**OCCUPATION CODE**	
DUTY TITLE	MANAGE BUSINESS INFORMATION SYSTEMS IN AN ORGANIZATION	**DUTY NO.**	810
TASK TITLE	MONITOR BUSINESS INFORMATION SYSTEMS IN AN ORGANIZATION	**TASK NO.**	8101
PERFORMANCE CRITERIA	A person performing this task must be able to monitor business information systems in an organization as per industry standards and national ICT guidelines.		
RANGE STATEMENT	This task can be performed in a workshop or in a client's office. The following equipment and tools should be available: 1. Operating Systems resource monitors; 2. System development guideline; 3. Computer system. This person shall work under minimum supervision.		

EVIDENCE REQUIREMENTS	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Identify performance criteria to be monitored; 2. Gather performance data; 3. Analyze gathered performance data; 4. Create performance monitoring report; 5. Observe health and safety precautions; 6. Clean workplace; 7. Store tools.	**Detailed knowledge about:** **1.0 Methods:** The person must be able to explain how to: 1.1. Identify performance criteria to be monitored; 1.2. Gather performance data; 1.3. Analyze gathered performance data; 1.4. Create performance monitoring report; 1.5. Clean the workplace. **2.0 Principles:** The person must be able to explain the principles of: 2.1. Monitoring business information systems; 2.2. Analyzing gathered performance data. **3.0 Theories:** The person must be able to explain: 3.1. Types of monitoring tools for business information systems; 3.2. Identifying performance criteria to be monitored. **4.0 Essential skills:** 4.1 Problem solving skills; 4.2 Critical thinking skills; 4.3 Analytical skills; 4.4 Communication skills; 4.5 Report writing skills; 4.6 Interpersonal skills; 4.7 Teamwork skills; 4.8 Leadership skills; 4.9 Project management skills;

	4.10Time management skills.
DESCRIPTION OF END PRODUCTS/SERVICE	Business information systems are monitored in an organization as per industry standards and national ICT guidelines.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Safe handling of system software and business information system; 2. Safe handling of software; 3. Extent of responsibilities.

OCCUPATION	IT TECHNOLOGIST	**OCCUPATION CODE**	
DUTY TITLE	MANAGE BUSINESS INFORMATION SYSTEMS IN AN ORGANIZATION	**DUTY NO.**	810
TASK TITLE	EVALUATE BUSINESS INFORMATION SYSTEM INVESTMENTS IN AN ORGANIZATION	**TASK NO.**	8102
PERFORMANCE CRITERIA	A person performing this task must be able to evaluate business information system investments in an organization as per industry standards and national ICT guidelines.		
RANGE STATEMENT	This task can be performed in a workshop or in a client's office. The following equipment and tools should be available: 1. Operating Systems resource monitors; 2. System development guideline; 3. Computer system. This person shall work under minimum supervision.		

EVIDENCE REQUIREMENTS	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Interpret performance monitoring report; 2. Identify business/corporate values to benefit from business information systems; 3. Assess return on investment; 4. Create evaluation report; 5. Observe health and safety precautions; 6. Clean workplace; 7. Store tools.	**Detailed knowledge about:** **1.0. Methods:** The person must be able to explain how to: 1.1. Interpret performance monitoring report; 1.2. Identify business/corporate values to benefit from business information systems; 1.3. Assess return on investment; 1.4. Create evaluation report; 1.5. Clean the workplace. **2.0. Principles:** The person must be able to explain the principles of: 2.1. Evaluating business information system investments; 2.2. Assessing return on investment. **3.0. Theories:** The person must be able to explain: 3.1. Types of evaluation of business information system investments; 3.2. Creating evaluation report. **4.0. Essential skills:** 7.1. Problem solving skills; 7.2. Critical thinking skills; 7.3. Analytical skills; 7.4. Communication skills; 7.5. Report writing skills; 7.6. Interpersonal skills; 7.7. Teamwork skills;

	7.8. Leadership skills; 7.9. Project management skills; 7.10. Time management skills.
DESCRIPTION OF END PRODUCTS/SERVICE	Business information system investments are evaluated in an organization as per industry standards and national ICT guidelines.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Safe handling of system software and business information system; 2. Safe handling of software; 3. Extent of responsibilities.

OCCUPATION	IT TECHNOLOGIST	**OCCUPATION CODE**	
DUTY TITLE	MANAGE BUSINESS INFORMATION SYSTEMS IN AN ORGANIZATION	**DUTY NO.**	810
TASK TITLE	TUNE PERFORMANCE OF BUSINESS INFORMATION SYSTEMS IN AN ORGANIZATION	**TASK NO.**	8103
PERFORMANCE CRITERIA	A person performing this task must be able to tune performance of business information systems in an organization as per industry standards and national ICT guidelines.		
RANGE STATEMENT	This task can be performed in a workshop or in a client's office. The following equipment and tools should be available: 1. Operating Systems resource monitors; 2. System development guideline; 3. Computer system. This person shall work under minimum supervision.		

EVIDENCE REQUIREMENTS

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Interpret evaluation report; 2. Identify optimal performance settings; 3. Customize settings of business information systems; 4. Verify performance tuning; 5. Create performance tuning report; 6. Observe health and safety precautions; 7. Clean workplace; 8. Store tools.	**Detailed knowledge about:** **1.0. Methods:** The person must be able to explain how to: 1.1. Interpret evaluation report; 1.2. Identify optimal performance settings; 1.3. Customize settings of business information systems; 1.4. Verify performance tuning; 1.5. Create performance tuning report; 1.6. Clean the workplace. **2.0. Principles:** The person must be able to explain the principles of: 2.1. Performance tuning of business information systems; 2.2. Verifying performance tuning. **3.0. Theories:** The person must be able to explain: 3.1. Types of performance tuning of business information systems; 3.2. Creating performance tuning report. **4.0. Essential skills:** 4.1. Problem solving skills; 4.2. Critical thinking skills; 4.3. Analytical skills; 4.4. Communication skills; 4.5. Report writing skills; 4.6. Interpersonal skills;

	4.7. Teamwork skills; 4.8. Leadership skills; 4.9. Project management skills; 4.10. Time management skills.
DESCRIPTION OF END PRODUCTS/SERVICE	Performance of business information systems is tuned in an organization as per industry standards and national ICT guidelines.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Safe handling of system software and business information system; 2. Safe handling of software; 3. Extent of responsibilities.

OCCUPATION	IT TECHNOLOGIST	**OCCUPATION CODE**	
DUTY TITLE	MANAGE ICT PROJECTS IN AN ORGANIZATION	**DUTY NO.**	811
TASK TITLE	MANAGE ICT PROJECT'S PROCESSES IN AN ORGANIZATION	**TASK NO.**	8111
PERFORMANCE CRITERIA	A person carrying out this task must be able to set ICT project's processes in an organization as per industry standards and national ICT guidelines.		
RANGE STATEMENT	This task can be achieved in the office environment or at customer's site. The following items and tools must be available: 1. Computer; 2. Institution's manual; 3. Project management software tools; 4. Presentation tools. This person shall work independently.		

EVIDENCE REQUIREMENTS	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Identify project Objectives; 2. Identify parameters of objective of the project; 3. Delineate responsibilities in the projects; 4. Calculate budget of the project; 5. Observe health and safety precautions; 6. Clean workplace; 7. Store tools.	**Detailed knowledge about:** **1.0. Methods:** The person must be able to explain how to: 1.1. Identify project Objectives; 1.2. Identify parameters of objective of the project; 1.3. Delineate responsibilities in the projects; 1.4. Calculate budget of the project. **2.0. Principles:** The person must be able to explain the principles of: 2.1. Project Planning; 2.2. Performance Measurement; 2.3. Performance Evaluation; 2.4. Risk Assessment; 2.5. Progress Monitoring. **3.0. Theories**: The person must be able to explain: 3.1. Project goals and objectives; 3.2. Deliverables; 3.3. Organizational alignment; 3.4. Team roles and responsibilities; 3.5. Strategy for initiation and execution; 3.6. Budgeting and scheduling; 3.7. Priorities and milestones; 3.8. Accountability and responsibility; 3.9. Communication plan. **4.0. Essential Skills:** 4.1. Problem solving skills;

	4.2. Critical thinking skills; 4.3. Analytical skills; 4.4. Communication skills; 4.5. Report writing skills; 4.6. Interpersonal skills; 4.7. Teamwork skills; 4.8. Leadership skills; 4.9. Project management skills; 4.10. Time management skills.
DESCRIPTION OF END PRODUCTS/SERVICE	ICT project's processes are set in an organization as per industry standards and national ICT guidelines.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Human resource management; 2. Information analysis; 3. Extend of responsibilities.

OCCUPATION	IT TECHNOLOGIST	**OCCUPATION CODE**	
DUTY TITLE	MANAGE ICT PROJECTS IN AN ORGANIZATION	**DUTY NO.**	811
TASK TITLE	DEVELOP ICT PROJECT'S STRATEGY IN AN ORGANIZATION	**TASK NO.**	8112
PERFORMANCE CRITERIA	A person carrying out this task must be able to set ICT project's strategy in an organization as per industry standards and national ICT guidelines.		
RANGE STATEMENT	This task can be achieved in the office environment or at customer's site. The following items and tools must be available: 1. Computer; 2. Institution's manual; 3. Presentation tools. This person shall work independently.		

EVIDENCE REQUIREMENTS	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Identify project strategy; 2. Identify parameters of strategy of the project; 3. Measure project strategy; 4. Observe health and safety precautions; 5. Clean workplace; 6. Store tools.	**Detailed knowledge about:** **1.0. Methods:** The person must be able to explain how to: 1.1. Identify project strategy; 1.2. Identify parameters of strategy of the project; 1.3. Measure project strategy. **2.0. Principles:** The person must be able to explain the principles of: 2.1. Project Planning; 2.2. Performance Measurement ; 2.3. Performance Evaluation; 2.4. Risk Management; 2.5. ChangeManagement. **3.0. Theories**: The person must be able to explain: 3.1. Project goals and outcomes; 3.2. Projects deliverables; 3.3. Organizational alignment; 3.4. Team roles and responsibilities; 3.5. Strategy for initiation and execution; 3.6. Time management and scheduling; 3.7. Priorities and milestones; 3.8. Accountability and responsibility; 3.9. Communication plan. **4.0. Essential Skills:** 4.1. Problem solving skills;

	4.2. Critical thinking skills; 4.3. Analytical skills; 4.4. Communication skills; 4.5. Report writing skills; 4.6. Interpersonal skills; 4.7. Teamwork skills; 4.8. Leadership skills; 4.9. Project management skills; 4.10. Team management skills.
DESCRIPTION OF END PRODUCTS/SERVICE	ICT project's strategy is set in an organization as per industry standards and national ICT guidelines.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Quality management; 2. Human resource management; 3. Information analysis; 4. Extend of responsibilities.

OCCUPATION	IT TECHNOLOGIST	**OCCUPATION CODE**	
DUTY TITLE	MANAGE ICT PROJECTS IN AN ORGANIZATION	**DUTY NO.**	811
TASK TITLE	EVALUATE ICT PROJECT'S STRATEGY IN AN ORGANIZATION	**TASK NO.**	8113
PERFORMANCE CRITERIA	A person carrying out this task must be able to evaluate ICT project's strategy in an organization as per industry standards and national ICT guidelines.		
RANGE STATEMENT	This task can be achieved in the office environment or client's office. The following qualitative tools must be used to evaluate project strategy: 1. Computer; 2. Survey tools; 3. Observations; 4. Case studies; 5. Focus groups; 6. Interviews. This person shall work independently.		

EVIDENCE REQUIREMENTS	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Identify parameters of measure of the strategy; 2. Specify evaluation parameters of a project; 3. Monitor project strategy; 4. Observe health and safety precautions; 5. Clean workplace; 6. Store tools.	**Detailed knowledge about:** **1.0. Methods:** The person must be able to explain how to: 1.1. Identify parameters of measure of the strategy; 1.2. Specify evaluation parameters of a project; 1.3. Monitor project strategy. **2.0. Principles:** The person must be able to explain the principles of: 2.1. Project structuring; 2.2. Cost benefit analysis; 2.3. Project participation; 2.4. Performance management; 2.5. Risk management; 2.6. Progress monitoring; 2.7. Change management. **3.0. Theories**: The person must be able to explain: 3.1. Project goals and objectives; 3.2. Project deliverables; 3.3. How to maintain organizational alignment; 3.4. Team roles and responsibilities; 3.5. Strategy for initiation and execution; 3.6. Budgeting and scheduling;

	3.7. Priorities and milestones; 3.8. Accountability and responsibility. **4.0. Essential Skills:** 4.1. Problem solving skills; 4.2. Critical thinking skills; 4.3. Analytical skills; 4.4. Communication skills; 4.5. Report writing skills; 4.6. Interpersonal skills; 4.7. Teamwork skills; 4.8. Leadership skills; 4.9. Project management skills; 4.10. Time management skills.
DESCRIPTION OF END PRODUCTS/SERVICE	ICT project's strategy is evaluated in an organization as per industry standards and national ICT guidelines.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Human resource management; 2. Information analysis; 3. Extend of responsibilities.

OCCUPATION	IT TECHNOLOGIST	**OCCUPATION CODE**	
DUTY TITLE	MANAGE ICT PROJECTS IN AN ORGANIZATION	**DUTY NO.**	811
TASK TITLE	MONITOR PHASES OF ICT PROJECTS IN AN ORGANIZATION	**TASK NO.**	8114
PERFORMANCE CRITERIA	A person carrying out this task must be able monitor phases of ICT projects in an organization as per industry standards and national ICT guidelines.		
RANGE STATEMENT	This task can be achieved in the office environment. The following items and tools must be available: 1. Computer; 2. Project documentation; 3. Gantt Chart; 4. Logic Network; 5. Pert Chart; 6. Product Breakdown Structure. This person shall work independently.		

EVIDENCE REQUIREMENTS	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Initiate project; 2. Assess project plan; 3. Measure project execution; 4. Observe health and safety precautions; 5. Clean workplace; 6. Store tools.	**Detailed knowledge about:** **1.0. Methods:** The person must be able to explain how to: 1.1. Initiate project; 1.2. Assess project plan; 1.3. Measure project execution. **2.0. Principles:** The person must be able to explain the principles of: 2.1. Project Planning; 2.2. Project Implementation; 2.3. Total Participation; 2.4. Progress Monitoring. **3.0. Theories**: The person must be able to explain: 3.1. Project goals and objectives; 3.2. Project confidentiality; 3.3. How to maintain organizational alignment; 3.4. Team roles and responsibilities; 3.5. Strategy for initiation and execution; 3.6. Budgeting and scheduling; 3.7. Priorities and milestones; 3.8. Accountability and responsibility; 3.9. Communication plan. **4.0. Essential Skills:** 4.1. Problem solving skills;

	4.2. Critical thinking skills; 4.3. Analytical skills; 4.4. Communication skills; 4.5. Report writing skills; 4.6. Interpersonal skills; 4.7. Teamwork skills; 4.8. Leadership skills; 4.9. Project management skills; 4.10. Time management skills.
DESCRIPTION OF END PRODUCTS/SERVICE	Phases of ICT projects are monitored in an organization as per industry standards and national ICT guidelines.
CIRCUMSTANTIAL KNOWLEDGE	Detailed knowledge about: 1. Human resource management; 2. Information Analysis; 3. Extend of responsibilities.

TABLE 1: DACUM CHARTS FOR IT TECHNOLOGIST - NTA 8

DUTIES	TASKS	ENABLERS
1.0. Develop ICT governance tools in an organization.	1.1. Prepare ICT Governance tools in an organization. 1.2. Assess implementation of ICT governance tools in an organization. 1.3. Review ICT governance tools in an organization.	**Generic Skills and Knowledge** • ICT management skills • Engineering ethics • Human resource management • Engineering management • Risk management skills • Computer skills on hardware and software • Skills and knowledge in testing, recording and interpretation of findings in computer systems • Learning and research skills • Leadership and decision making skills • Audio/visual/written presentation skills • Communication and report writing skills to prepare • Analytical skills **Tools and Equipment** • ICT inventory • Policy manual • Insurance policy **Work Behaviors** • Team work • Time management

DUTIES	TASKS	ENABLERS
2.0. Develop ICT acquisition plan in an organization.	2.1. Review a list of ICT systems and services required in an organization. 2.2. Develop ICT acquisition plan in an organization. 2.3. Assess ICT acquisition plan in an organization.	**Generic Skills and Knowledge** • Basic computer skills on hardware and software • Engineering economics • Hands on experience in testing, recording and interpretation of findings in computer systems • Communication and report writing skills to prepare • Analytical skills **Tools and Equipment** • Procurement manual **Work Behaviors** • Team work • Time management

DUTIES	TASKS	ENABLERS
3.0. Manage computer systems security in an organization.	3.1. Interpret security policies and standards in an organization. 3.2. Implement ICT security system in an organization. 3.3. Implement security management of ICT system in an organization. 3.4. Assess security system in an organization.	**Generic Skills and Knowledge** • Cyber security • Skills on database technologies • Skills on computer networks • Skills on hardware • Basic skills on Operating Systems • Basic skills on Cyber Security • Communication and report writing skills • Analytical skills • Problem solving skills • Ethical skills **Tools and Equipment** • Computer **Materials** • Data **Work Behaviors** • Patience • Meticulous attention to detail • A logical approach to work

DUTIES	TASKS	ENABLERS
4.0. Manage user technical support system in an organization.	4.1. Create technical support system in an organization. 4.2. Assign roles of technical support team in an organization. 4.3. Assess technical support system in an organization.	**Generic Skills and Knowledge** • Skills on database technologies • Skills on computer networks • Skills on hardware • Basic skills on Operating Systems • Basic skills on Cyber Security • Basic skills on scripting languages • Communication and report writing skills • Analytical skills • Problem solving skills • Ethical skills **Tools and Equipment** • Diagnostic tools • Technician toolbox • MySQL. • SQL Server Management Studio. • DevOps Tools • Visual Studio Code • Enterprise Service Management (ESM) Tools. • PhpMyAdmin Tool. • Computer **Materials** • Data **Work Behaviors** • Patience • Meticulous attention to detail • A logical approach to work

DUTIES	TASKS	ENABLERS
5.0. Manage complex computer networks in an organization.	5.1. Configure complex computer networks in an organization. 5.2. Upgrade complex computer networks in an organization. 5.3. Troubleshoot complex computer networks in an organization. 5.4. Supervise complex computer networks in an organization.	**Generic Skills and Knowledge** • Basic skills on Operating Systems • Basic skills on Cyber Security • Basic skills on scripting languages • Communication and report writing skills • Analytical skills • Problem solving skills • Ethical skills **Tools and Equipment** • Operating Systems resource monitors **Materials** • User profiles • User management manual **Work Behaviors** • Team work • Time management

DUTIES	TASKS	ENABLERS
6.0. Introduce emerging ICT solutions in an organization.	6.1. Research on new ICT solutions in an organization. 6.2. Plan introduction of new ICT solutions in an organization. 6.3. Conduct training on new ICT solutions in an organization.	**Generic Skills and Knowledge** • Skills on research • Basic skills on Operating Systems • Basic skills on Cyber Security • Basic skills on scripting languages • Communication and report writing skills • Analytical skills • Problem solving skills • Ethical skills **Tools and Equipment** • Operating Systems resource monitors **Materials** • User profiles • User management manual **Work Behaviors** • Team work • Time management

DUTIES	TASKS	ENABLERS
7.0. Manage cloud computing based services in an organization.	7.1. Integrate cloud computing infrastructure in an organization. 7.2. Configure and manage cloud computing service in an organization. 7.3. Deploy cloud computing based business system in an organization. 7.4. Monitor cloud computing applications and services in an organization.	**Generic Skills and Knowledge** • Knowledge on development environments i.e. Azure Cloud Services • Visual Studio skills. • Knowledge on cloud deployment applications languages like NET, Java, Node.js, PHP, Python or Ruby • Basic skills on Operating Systems • Basic skills on Cyber Security • Basic skills on scripting languages • Communication and report writing skills • Analytical skills • Problem solving skills • Ethical skills **Tools and Equipment** • Operating Systems resource monitors **Materials** • User profiles • User management manual

DUTIES	TASKS	ENABLERS
8.0. Evaluate system requirements in an organization.	8.1. Review System Requirements Specification (SRS) in an organization. 8.2. Prepare a change management plan in an organization.	**Generic Skills and Knowledge** • Oral and written communication skills • Interpersonal and consultative skills • Facilitation skills • Analytical thinking and problem solving • Being detail-oriented and capable of delivering a high level of accuracy • Organizational skills • Knowledge of business structure • Stakeholder analysis • Requirements engineering • Costs benefit analysis • Processes modelling • Understanding of networks, databases and other technology
9.0. Evaluate designs of business information systems in an organization.	9.1. Review System Design Document (SDD) in an organization. 9.2. Assess designs of business information systems in an organization. 9.3. Communicate designs of business information systems in an organization.	**Generic Skills and Knowledge** • Communication and report writing skills • Analytical skills • Basic coding and programming abilities • Leadership skills • An understanding of complex systems and how they work together • A desire to learn and stay on top of changing technological trends • Strong written and verbal communication skills • Excellent interpersonal skills • Complex understanding of business needs, processes, and structures • Presentational abilities • Project management skills **Tools and Equipment** • Antistatic wrist strap • Safety gears

DUTIES	TASKS	ENABLERS
10.0. Manage business information systems in an organization.	10.1. Monitor business information systems in an organization. 10.2. Evaluate business information system investments in an organization. 10.3. Tune performance of business information systems in an organization.	**Generic Skills and Knowledge** • Communication and report writing skills • Analytical skills • Leadership skills • A desire to learn and stay on top of changing technological trends • Written and verbal communication skills • Interpersonal skills • Presentational abilities • Project management skills **Tools and Equipment** • Antistatic wrist strap Safety gears

DUTIES	TASKS	ENABLERS
11.0. Manage ICT projects in an organization.	11.1. Manage ICT project's processes in an organization. 11.2. Develop ICT project's strategy in an organization. 11.3. Evaluate ICT project's strategy in an organization. 11.4. Monitor phases of ICT projects in an organization.	**Generic Skills and Knowledge** • Communication and report writing skills • Analytical skills • Basic coding and programming abilities • Response kills • Leadership skills • Skills to build project teams • Interpersonal development skills • Problem solving skills • An understanding of complex systems and how they work together • Complex understanding of business needs, processes, and structures • Risk management • Quality management • Cost management • Time management • Legal basis **Tools and Equipment** • Antistatic wrist strap • Safety gears