THE NATIONAL COUNCIL FOR TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING

OCCUPATIONAL STANDARDS

OCCUPATION: BIG-DATA TECHNICIAN

LEVEL: NTA LEVEL 4

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ABBREVIATIONS

DataNode	Data Node
DFS	Distributed File System
HDFS	Hadoop Distributed File System
NACTVET	National Council for Technical and Vocational Education and Training
NameNode	Name Node of HDFS
NOS	National Occupational Standards
OS	Occupational Standards
SSH	Secure Shell
TET	Technical Education and Training
TVET	Technical and Vocational Education and Training
YARN	Apache Hadoop YARN

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 programme 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 Area:	This is a broad grouping of related jobs. (Example: food service)
Occupational Competence:	The application of knowledge and skills that consistently meet the standards required by 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 a performance tool of assessment of the prescribed outcomes.
Occupational/Job Analysis:	A process used to identify the tasks that are important to employees in any given occupation**.**
Performance Criteria:	Indicate expected end results or outcomes in the 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:	A set of statements, 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, circumstantial knowledge, attitudes, performance standards, tools and materials needed, as well as safety concerns required for the employees performing it.
Task:	A work activity that has a definite beginning and ending, is observable or measurable, and consists of two or more definite steps that leads to a product, service, or decision.
Underpinning Knowledge:	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 confirm 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, with a high level of human development. 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 and Vocational Education and Training (NACTVET) has begun the job of drafting Occupational Standards (OS) that will eventually be adopted as National Occupational Standards (NOS) for use in the delivery of TET that meets the needs of the labour market and the country's economic agenda.

Occupational Standards (OS) are performance criteria that are matched with labour market demands. Each of them describes the functions, performance standards, and understanding or knowledge underpinning a given occupation. They combine skills, knowledge, and attitudes to describe best practice. They are useful tools for establishing job roles, personnel recruitment, supervision, and appraisal, as well as TET Standards. They are also helpful for benchmarking and harmonizing job 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 application across all public and private institutions.

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

For the purpose of TET delivery, Tanzania has adopted the Competence 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 training (CBET) programmes. Therefore, it is quite pertinent

for TET institutions to use the relevant occupational standards as a benchmark for formulating their curricula.

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.

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 process of developing these Occupational Standards involved both local and international expertise. The process began with an examination of major documents that guide Tanzanian skills development including the *10-year National Skills Development Strategy (2016-2026)*. NACTVET 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 team of experts in consultation with practitioners developed draft occupational standards. The draft document was used to develop an occupational profile for each occupation (DACUM Chart), which is attached as an **Appendix** to every Occupational Standard.

The occupational standards were validated during the stakeholders' forum held on 22nd and 23rd February 2024 at Morogoro. The information from the stakeholders' forum provides insight from the workplace, professional bodies, regulatory bodies and sector ministries regarding trends and changes in the profession, including how well graduates are prepared for working in the occupation.

3.0 THE SCOPE AND OVERVIEW OF THE OCCUPATION STANDARDS FOR BIG-DATA TECHNICIANS

The standards cover a broad range of duties and tasks that can be performed by a Big-Data Technician. However, the occupational standards are not meant to replace individual job descriptions. Instead, they are to be used for guidance in defining skill levels and knowledge for the technician in specific settings or positions. The Big-Data Technician 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.

The Big-Data Technician shall play an important role in big-data project requirement acquisition, requirement analysis, and project design under the supervision of big-data engineers. They can also perform big-data platform operation and maintenance, data collection, data annotation and data visualization and application. Generally, the Big-Data Technician performs the following responsibilities:

a) Project requirement acquisition and preparation of big-data platforms

b) Monitoring of big-data platform operation

c) Manual-based data collection

d) Data annotation

e) Data visualization based on excel

f) Hardware system construction

g) Software system deployment

h) System operation and maintenance and security

i) Data processing

j) Data query

The Occupational Standards have been clustered into NTA qualification levels, i.e. NTA 4, 5 and 6.

4.0 VALIDITY PERIOD

Due to the rapid development of technology, the validity period of occupational standards is 3-5 years. The review will proceed in the same manner as the one before it, with new occupational standards being developed based on current trends of the labour market.

5.0 OCCUPATIONAL STANDARDS

5.1 OCCUPATIONAL STANDARDS FOR BIG-DATA TECHNICIAN – NTA LEVEL 4

<table>
<tr><td>OCCUPATION</td><td>BIG-DATA TECHNICIAN</td><td>OCCUPATION CODE</td><td></td></tr>
<tr><td>DUTY TITLE</td><td>PERFORM PROJECT REQUIREMENT ANALYSIS OF BIG-DATA PLATFORMS</td><td>DUTY NO.</td><td>401</td></tr>
<tr><td>TASK TITLE</td><td>CONDUCT CUSTOMER DEMAND SURVEY AND ACQUISITION</td><td>TASK NO.</td><td>4011</td></tr>
<tr><td>PERFORMANCE CRITERIA</td><td colspan="3">The person performing this task must be able to choose suitable analysis methods and communication modes with customers before demand analysis; identify the members of customer demand analysis team; and conduct the demand survey</td></tr>
<tr><td>RANGE STATEMENT</td><td colspan="3">The task can be performed in the conference room or office under the supervision of senior big-data technicians or big-data engineers.
The tools and equipment to be used include:
1. Laptops;
2. White paper;
3. Office software, such as Microsoft Office;
4. E-mail;
5. Instant messengers.
6. Safety gear</td></tr>
<tr><td colspan="4">EVIDENCE REQUIREMENT</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 to do the following:
1. Prepare customer demand survey plans and outline;
2. Identify the members of customer demand analysis team;
3. Set up a customer demand analysis team;
4. Determine major issues of the survey;
5. Obtain customer demands;
6. Obtain and define business details of customers;
7. Obtain customers' focus of attention;
8. Conduct feasibility analysis of projects.
9. Observe health, occupational and environmental safety, rules and regulations</td><td colspan="2">Detailed knowledge about:
1.0 Methods
The person performing this task must be able to explain how to:
1.1 Prepare survey plans and outline;
1.2 Identify the members of customer demand analysis team;
1.3 Obtain accurate customer demands;
1.4 Convert business requirements into professional technical requirements.

2.0 Principles
The person performing this task must be able to explain the following principles:
2.1 Methods and steps of demand survey analysis;
2.2 Methods of feasibility analysis.

3.0 Theories
The person performing this task must be able to explain the following:</td></tr>
</table>

	3.1 Contents included in customer demands; 3.2 Composition of the customer demand analysis team; 3.3 Major issues of the demand survey; 3.4 Methods of the demand survey; 3.5 Contents of the survey plan. **4.0 Essential Skills** 4.1 Activity planning and organization skills; 4.2 Documentation skills; 4.3 Communication skills; 4.4 Computer skills; 4.5 Teamwork skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	The result of the demand survey (interview records, questionnaire, etc.) is submitted in accordance with industry standards and customer demands.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Communication skills; 2. Knowledge related to customer business.

OCCUPATION	BIG-DATA TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	PERFORM PROJECT REQUIREMENT ANALYSIS OF BIG-DATA PLATFORMS	**DUTY NO.**	401
TASK TITLE	ORGANISE CUSTOMER DEMANDS AND PREPARE DEMAND ANALYSIS DOCUMENTS	**TASK NO.**	4012
PERFORMANCE CRITERIA	The person performing this task must be able to filter out infeasible demands, explore real customer demands, propose solutions and design products on this basis, and prepare demand analysis documents.		
RANGE STATEMENT	The task can be performed in the office under the supervision of senior big-data technicians or big-data engineers. The tools and equipment to be used include: 1. Laptops; 2. Office software, such as Microsoft Office; 3. E-mail; 4. Instant messengers. 5. Safety gear		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Analyse and summarize conceptual demands; 2. Analyse and summarize scene demands; 3. Analyse and summarize UI demands; 4. Analyse and summarize function demands; 5. Propose solutions to customer demands; 6. Verify demand solutions; 7. Prepare demand analysis documents. 8. Observe health, occupational and environmental safety, rules and regulations	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Define the real demand of customers; 1.2 Prepare demand specifications. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Contents of real demands; 2.2 Demand analysis methods. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Contents of target demands; 3.2 Contents of business requirements; 3.3 Methods of verifying demand solutions; 3.4 Contents of demand specifications; 3.5 Databases; 3.6 Data flow diagrams; 3.7 Big-data technology architecture.

	4.0 Essential Skills 4.1 Activity planning and organization skills; 4.2 Documentation skills; 4.3 Communication skills; 4.4 Computer skills; 4.5 Teamwork skills; 4.6 Problem solving skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	Customer demand analysis documents are prepared in accordance with business requirements.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Occupational health and safety; 2. Knowledge related to customer business.

OCCUPATION	BIG-DATA TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	CARRY OUT MONITORING OF BIG-DATA PLATFORM OPERATION	**DUTY NO.**	402
TASK TITLE	CARRY OUT MONITORING OF BIG-DATA PLATFORM OPERATION THROUGH THE PLATFORM MANAGEMENT INTERFACE	**TASK NO.**	4021
PERFORMANCE CRITERIA	The person performing this task must be able to monitor the operation and resource status of big-data platforms in real time through the user management system to find out faults in time.		
RANGE STATEMENT	The task can be performed in the office under the supervision of big-data engineers. The tools and equipment to be used include: 1. Laptops. 2. Safety gear		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Open the user management interface of related components of big-data platforms; 2. View the operation status of the platform; 3. Analyse the operation status data; 4. Discover abnormal situations in operation; 5. View the resources usage; 6. Analyse the resource status; 7. Discover the abnormal situations of resource status in time. 8. Observe health, occupational and environmental safety, rules and regulations	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Log in to each component management interface of the big-data platform; 1.2 View the operation status data and resource status data; 1.3 Check abnormal situations. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 The basic operation architecture of each component of big-data platforms. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 The open mode of related component interfaces of big-data platforms; 3.2 Indicators and parameters to be monitored of resource status; 3.3 Indicators and parameters to be monitored of operation status; 3.4 Common abnormal situations of big-data platforms; 3.5 Meaning of parameters of big-data platforms.

	4.0 Essential Skills 4.1 Computer skills; 4.2 Analysis and summary skills; 4.3 Problem solving skills; 4.4 Adaptability; 4.5 Standardized report writing skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	Operation logs of big-data platforms are recorded and monitored in accordance with the operation status of big-data platforms.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Basic knowledge of computer network; 2. Occupational health and safety.

OCCUPATION	BIG-DATA TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	CARRY OUT MONITORING OF BIG-DATA PLATFORM OPERATION	**DUTY NO.**	402
TASK TITLE	CARRY OUT MONITORING OPERATION THROUGH BIG-DATA PLATFORM OPERATION LOGS	**TASK NO.**	4022
PERFORMANCE CRITERIA	The person performing this task must be able to find out the abnormal situations in the operation of big-data platforms in time by viewing the operation log.		
RANGE STATEMENT	The task can be performed in the office under the supervision of big-data engineers. The tools and equipment to be used include: 1. Laptops; 2. SSH remote connection tools; 3. Office software. 4. Safety gear		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Use SSH to remotely connect to the big-data platform server; 2. View the operation log of each component of the platform; 3. Analyse logs; 4. Discover abnormal data in logs; 5. View and analyse alarm information; 6. Locate abnormalities; 7. Define the types of abnormalities. 8. Observe health, occupational and environmental safety, rules and regulations	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Use SSH remote connection tools; 1.2 Locate and view the log. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Analysis and filtering of abnormalities in logs; 2.2 Linux files operation. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Log storing positions of related components of big-data platforms; 3.2 Implications of log information; 3.3 Methods of finding abnormalities; 3.4 Logs of common abnormalities; 3.5 Methods of analysing and locating abnormalities; 3.6 Linux file storage commands; 3.7 Methods of using Linux Shell scripts. **4.0 Essential Skills**

	4.1 Computer skills; 4.2 Analysis and summary skills; 4.3 Problem solving skills; 4.4 Adaptability; 4.5 Standardized log writing skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	Operation logs of big-data platforms are monitored in accordance with the operation status of big-data platforms.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Basic knowledge of computer network; 2. Occupational health and safety.

OCCUPATION	BIG-DATA TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	CARRY OUT MONITORING OF BIG-DATA PLATFORM OPERATION	**DUTY NO.**	402
TASK TITLE	CARRY OUT MONITORING OF PLATFORM OPERATION WITH MONITORING TOOLS	**TASK NO.**	4023
PERFORMANCE CRITERIA	The person performing this task must be able to monitor the operation and resource status of the big-data platform with commonly-used monitoring tools, and find out abnormalities in time.		
RANGE STATEMENT	The task can be performed in the office under the supervision of big-data engineers. The tools and equipment to be used include: 1. Laptops; 2. SSH remote connection tools; 3. Office software. 4. Safety gear		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Choose suitable tools; 2. Operate monitoring tools; 3. Set various parameters of monitoring tools; 4. View monitoring data; 5. Analyse monitoring data; 6. Discover abnormal situations in operation; 7. Locate abnormalities with monitoring tools; 8. Record the operation status of the platform. 9. Observe health, occupational and environmental safety, rules and regulations	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Choose appropriate tools to monitor the operation status of platform components; 1.2 Set related parameters of monitoring tools; 1.3 View the data of monitoring tools. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Installation and use of monitoring tools. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Meaning of monitoring tool parameters; 3.2 Analysis process of monitoring data; 3.3 Methods of finding abnormalities; 3.4 Methods of analysing and locating abnormalities. **4.0 Essential Skills** 4.1 Computer skills; 4.2 Analysis and summary skills; 4.3 Problem solving skills;

	4.4 Adaptability; 4.5 Standardized log writing skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	Platform operation logs are recorded with monitoring tools and the monitoring records of platform operation are filled out in accordance with industry standards and customer demands.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Basic knowledge of computer network; 2. Occupational health and safety.

OCCUPATION	BIG-DATA TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	PERFORM MANUAL-BASED DATA COLLECTION	**DUTY NO.**	403
TASK TITLE	PERFORM DATA COLLECTION WITH INTERNET DATA COLLECTION TOOLS	**TASK NO.**	4031
PERFORMANCE CRITERIA	The person performing this task must be able to collect the data required by the big-data platform project with Internet data collection tools.		
RANGE STATEMENT	The task can be performed in the office under the supervision of big-data engineers. The tools and equipment to be used include: 1. Computers; 2. Operating system; 3. Office software; 4. Data collection tools (ForSpider, ParseHub, etc.). 5. Safety gear		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Select appropriate data collection tools to complete data collection; 2. Operate data collection tools; 3. Personalize data collection tools; 4. Store the data collected; 5. Export the data collected. 6. Observe health, occupational and environmental safety, rules and regulations	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Select appropriate collection tools according to different data sources; 1.2 Customize the selection of target data column. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Basic principles of data collection; 2.2 Basic structure of websites; 2.3 Internet laws and regulations. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Data collection features of different data sources; 3.2 Types of data sources collected by commonly-used tools; 3.3 Installation and use of collection tools; 3.4 Basic knowledge of computer network; 3.5 Knowledge of webpage development. **4.0 Essential Skills**

	4.1 Computer skills; 4.2 Analysis and summary skills; 4.3 Simple program code analysis skills; 4.4 Problem solving skills; 4.5 Self-management ability.
DESCRIPTION OF THE END PRODUCT / SERVICE	Data are collected with internet data collection tools and the data storage files are exported in accordance with industry standards.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Occupational health and safety.

OCCUPATION	BIG-DATA TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	PERFORM MANUAL-BASED DATA COLLECTION	**DUTY NO.**	403
TASK TITLE	PERFORM DATA ACQUISITION THROUGH INTERNET RETRIEVAL	**TASK NO.**	4032
PERFORMANCE CRITERIA	The person performing this task must be able to collect the data required by the big-data platform project through Internet retrieval.		
RANGE STATEMENT	The task can be performed in the office under the supervision of big-data engineers. The tools and equipment to be used include: 1. Computers; 2. Operating systems; 3. Office software; 4. Internet; 5. Network download tool. 6. Safety gear		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Analyse the features of data required; 2. Retrieve data; 3. Choose the way to download data; 4. Obtain the target data; 5. Store the target data. 6. Observe health, occupational and environmental safety, rules and regulations	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Retrieve the target data; 1.2 Download the target data. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Methods of Internet data retrieve; 2.2 Internet laws and regulations. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Commonly-used open-source data websites; 3.2 Methods of filtering target data; 3.3 Methods of defining retrieval conditions; 3.4 Ways to download data; 3.5 Basic knowledge of computer network; 3.6 Knowledge of webpage development; 3.7 Knowledge of Internet retrieval. **4.0 Essential Skills**

	4.1 Computer skills; 4.2 Analysis and summary skills; 4.3 Simple program code analysis skills; 4.4 Problem solving skills; 4.5 Practical operation skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	Data required by the big-data platform project are collected through Internet retrieval.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Occupational health and safety; 2. Information security knowledge.

OCCUPATION	BIG-DATA TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	PERFORM MANUAL-BASED DATA COLLECTION	**DUTY NO.**	403
TASK TITLE	PERFORM CONVERSION OF NON-ELECTRONIC DATA INTO ELECTRONIC DATA	**TASK NO.**	4033
PERFORMANCE CRITERIA	The person performing this task must be able to convert non-electronic data into electronic data required by the big-data platform through data entry and scanning.		
RANGE STATEMENT	The task can be performed in the office under the supervision of big-data engineers. The tools and equipment to be used include: 1. Computers; 2. Operating systems; 3. Office software; 4. Internet; 5. Data conversion tools. 6. Safety gear		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Analyse the features of non-electronic data; 2. Choose appropriate conversion tools; 3. Conduct accurate data entry and scanning; 4. Standardize the converted data; 5. Dispose of the dirty data during conversion; 6. Complete data storage according to the specified format requirements. 7. Observe health, occupational and environmental safety, rules and regulations	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Select data conversion tools; 1.2 Avoid abnormal data during conversion. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Methods of converting non-electronic data into electronic data. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Features of non-electronic data; 3.2 Methods of extracting non-electronic data; 3.3 Methods of comparing and converting abnormal data; 3.4 Setting and conversion of data storage formats; 3.5 Knowledge of file coding; 3.6 Knowledge of computer hardware.

	4.0 Essential Skills 4.1 Learning skills; 4.2 Analysis and summary skills; 4.3 Practical operation skills; 4.4 Problem solving skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	Non-electronic data are converted into electronic data required by the big-data platform through data entry and scanning.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Occupational health and safety; 2. Regular operation of office software.

OCCUPATION	BIG-DATA TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	PERFORM DATA PRE-PROCESSING	**DUTY NO.**	404
TASK TITLE	PERFORM DATA ANNOTATION, INDUCTION, AND CLASSIFICATION	**TASK NO.**	4041
PERFORMANCE CRITERIA	The person performing this task must be able to conduct pre-processing work such as data annotation, induction, and classification.		
RANGE STATEMENT	The task can be performed in the office under the supervision of big-data engineers. The tools and equipment to be used include: 1. Computers; 2. Operating systems; 3. Office software; 4. Image and audio processing software; 5. Annotation tools or platforms; 6. Data processing tools; 7. Data to be annotated; 8. Internet. 9. Safety gear		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Classify the data according to the types of annotation objects; 2. Accept the annotation task and clarify the annotation specifications and annotation point requirements; 3. Select tools to standardize images, audio, texts and other types of data. 4. Observe health, occupational and environmental safety, rules and regulations	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Classify annotation points according to the types of data; 1.2 Choose and use selection tools for image data, voice annotation tools for audio data, and word segmentation tools for text data. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Quality standards of data annotation; 2.2 Steps and process of data annotation. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Concepts and application scenes of data annotation; 3.2 Key technologies and methods of data pre-processing; 3.3 Operation methods of data downloading, viewing and storage;

	3.4 Knowledge of data-related business scenes. **4.0 Essential Skills** 4.1 Computer skills; 4.2 Document and report writing skills; 4.3 Communication and teamwork skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	Data files are annotated, reduced and classified and then submitted in accordance with industry standards and customer demands.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Occupational health and safety.

OCCUPATION	BIG-DATA TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	PERFORM DATA PRE-PROCESSING	**DUTY NO.**	404
TASK TITLE	REVIEW THE ANNOTATED DATA TO ENSURE THE QUALITY OF RESULTS	**TASK NO.**	4042
PERFORMANCE CRITERIA	The person performing this task must be able to ensure that the quality of data annotation results can meet the requirements.		
RANGE STATEMENT	The task can be performed in the office under the supervision of big-data engineers. The tools and equipment to be used include: 1. Computers; 2. Operating systems; 3. Office software; 4. Image and audio processing software; 5. Annotation tools or platforms; 6. Annotated data; 7. Internet. 8. Safety gear		

EVIDENCE REQUIREMENT	
PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Analyse and identify data types and storage formats; 2. Select tools to review the annotated data; 3. Complete data proofreading and related statistics. 4. Observe health, occupational and environmental safety, rules and regulations	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Review the annotated data according to quality standards; 1.2 Select the appropriate inspection method according to business requirements; 1.3 Make statistics of the annotated data according to business requirements. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Quality standards of image annotation; 2.2 Quality standards of voice annotation; 2.3 Quality standards of text annotation. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Application scenes and inspection processes of different inspection methods; 3.2 Basic combing of statistical methods;

	3.3 Using methods of commonly-used operating systems and software; 3.4 Using methods of office software; 3.5 Commonly-used operation methods of downloading, viewing and storing data; 3.6 Understanding and formulation of technical documents. **4.0 Essential Skills** 4.1 Computer skills; 4.2 Document and report writing skills; 4.3 Communication and teamwork skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	Data annotation completed in accordance with industry standards and customer demands.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Occupational health and safety.

OCCUPATION	BIG-DATA TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	CONDUCT DATA PRESENTATION	**DUTY NO.**	405
TASK TITLE	CARRY OUT CHART SELECTION BASED ON DATA FEATURES FOR EXCEL PRESENTATION	**TASK NO.**	4051
PERFORMANCE CRITERIA	The person performing this task must be able to ensure that appropriate charts are selected in Excel to present the data and reflect data features.		
RANGE STATEMENT	The task can be performed in the office under the supervision of big-data engineers. The tools and equipment to be used include: 1. Computers; 2. Operating systems; 3. Office software (Excel); 4. Internet; 5. Data to be processed. 6. Safety gear		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Use Excel to open data files and view data attributes and values; 2. Choose appropriate charts for data presentation according to data features; 3. Edit the chart elements in Excel and set the chart drawing; 4. Adjust the chart style in Excel and optimize the presentation effect of Excel charts. 5. Observe health, occupational and environmental safety, rules and regulations	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Use Excel to view, edit and save the data for presentation; 1.2 Choose appropriate charts for drawing in accordance with data features and demand analysis; 1.3 Adjust the layout and display content of graph presentation to optimize the presentation effect. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Fundamentals of data visualization; 2.2 Applicable scenes of different charts. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Drawing methods of different charts in Excel; 3.2 Optimization methods of data presentation effects in Excel: 3.3 Commonly-used operation knowledge of Excel; 3.4 Knowledge of graphic element design, layout and optimization;

	3.5 Basic concepts and knowledge of data analysis and statistics. **4.0 Essential Skills** 4.1 Computer skills; 4.2 Communication and teamwork skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	Excel files of chart-based data presentation are prepared according to data features.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Occupational health and safety.

OCCUPATION	BIG-DATA TECHNICIAN	**OCCUPATION CODE**	
DUTY TITLE	CONDUCT DATA PRESENTATION	**DUTY NO.**	405
TASK TITLE	PERFORM DATA ANALYSIS AND PREPARE DATA ANALYSIS REPORT	**TASK NO.**	4052
PERFORMANCE CRITERIA	The person performing this task must be able to export data charts in Excel, and summarize the presentation results of charts into data analysis reports.		
RANGE STATEMENT	The task can be performed in the office under the supervision of big-data engineers. The tools and equipment to be used include: 1. Computers; 2. Operating systems; 3. Office software (Word); 4. Charts of data presentation; 5. Internet. 6. Safety gear		

EVIDENCE REQUIREMENT

PRACTICAL PERFORMANCE	**UNDERPINNING KNOWLEDGE**
The person performing this task must be able to do the following: 1. Use Word to edit, modify and save images and text; 2. Export display results of data charts from Excel, and conduct simple summary and organization; 3. Prepare data analysis reports for typesetting and editing based on display results; 4. Find the problems existing in business based on the display results of charts for data analysis; 5. Propose solutions to existing problems stated in data analysis reports. 6. Observe health, occupational and environmental safety, rules and regulations	**Detailed knowledge about:** **1.0 Methods** The person performing this task must be able to explain how to: 1.1 Analyse the data in combination with data charts and explanatory text; 1.2 Express in an objective, accurate, and standardized manner; 1.3 Analyse the data in combination with relevant business or professional theories. **2.0 Principles** The person performing this task must be able to explain the following principles: 2.1 Specifications of terms and business expressions used in data analysis reports; 2.2 Writing standards of data analysis reports. **3.0 Theories** The person performing this task must be able to explain the following: 3.1 Basic composition of data analysis reports; 3.2 Selection of appropriate data charts to support data reports; 3.3 Methods of summarizing and organizing data and charts; 3.4 Knowledge of data retrieval in professional fields;

	3.5 Knowledge of formats and specifications of professional reports. **4.0 Essential Skills** 4.1 Report writing skills; 4.2 Computer skills; 4.3 Communication and teamwork skills.
DESCRIPTION OF THE END PRODUCT / SERVICE	Data analysis reports based on data charts are written and submitted in accordance with industry standards.
CIRCUMSTANTIAL KNOWLEDGE	**Detailed knowledge about:** 1. Knowledge of business background and project objective survey; 2. Occupational health and safety.

APPENDIX: DACUM CHART FOR BIG-DATA TECHNICIAN - NTA LEVEL 4

DUTIES	TASKS	ENABLERS
1.0 Perform project requirement analysis of big-data platforms	1.1 Conduct customer demand survey and acquisition. 1.2 Organise customer demands and prepare demand analysis documents.	**General skills and knowledge** · Steps of demand analysis · Demand survey plan formulation · Demand acquisition methods · Contents of demand specifications **Tools and equipment** · Computers · Office software · Instant messengers **Materials** · A4 paper **Requirements for employees** · Organization of interviews · Formulation of survey plans · Hard working · High sense of responsibility
2.0 Carry out monitoring of big-data platform operation	2.1 Carry out monitoring of big-data platform operation through the platform management interface. 2.2 Carry out monitoring operation through big-data platform operation logs. 2.3 Carry out monitoring of platform operation with monitoring tools.	**General skills and knowledge** · Methods of opening the monitoring page of each component of big-data platform · Methods of viewing the operation status of the platform through the interface · Methods of viewing the resource status of the platform through the interface · Log storage information of each component of big-data platforms · Methods of viewing the operation log through the interface · Method of viewing the operation log by commands · Method of analysing and viewing alarm information **Tools and equipment** · Computers · Internet · SSH remote connection tools

DUTIES	TASKS	ENABLERS
		Requirements for employees · Hard working · High sense of responsibility · Carefulness
3.0 Perform manual-based data collection	3.1 Perform data collection with internet data collection tools. 3.2 Perform data acquisition through internet retrieval. 3.3 Perform conversion of non-electronic data into electronic data.	**General skills and knowledge** · Selection of internet data collection tools · Basic operation of data collection tools · Custom settings for data collection tools · Target data field selection · Setting of Internet retrieval conditions · Methods of converting non-electronic data into electronic data · Basic operation of non-electronic media data conversion tools · Data normalization methods · Data storage **Tools and equipment** · Computers · Internet · Data collection tools · Hardware equipment such as scanners **Requirements for employees** · Hard working · High sense of responsibility · Self-discipline · Compliance with Internet laws and regulations · Outstanding practice competence
4.0 Perform Data pre-processing	4.1 Perform Data annotation, induction, and classification. 4.2 Review the annotated data to ensure the quality of results.	**General skills and knowledge** · Operation knowledge of operating systems · Operation knowledge of office software · Operation knowledge of software tools · Knowledge of data file types and formats · Internet usage

DUTIES	TASKS	ENABLERS
		Tools and equipment · Computers · Office software · Image and audio processing software · Annotation tools or platforms **Requirements for employees** · Proficiency in using software tools · Work efficiency · Professionalism of carefulness and conscientiousness · Ensuring the security and privacy of data annotation
5.0 Conduct Data presentation	5.1 Carry out chart selection based on data features for Excel presentation. 5.2 Perform Data analysis and prepare data analysis report.	**General skills and knowledge** · Operation knowledge of operating systems · Operation knowledge of office software · Knowledge of data file types and formats · Internet usage **Tools and equipment** · Computers · Office software (Excel and Word) **Requirements for employees** · Proficiency in using office software · Work efficiency · Professionalism of carefulness and conscientiousness · Ensuring the security and privacy of data annotation