REPUBLIC OF KENYA

NATIONAL OCCUPATIONAL STANDARD

FOR

COMPUTER SCIENCE TECHNICIAN

KNQF LEVEL 6

(CYCLE 3)

PROGRAMME ISCED CODE: 0613 554 A.

TVET CDACC
P.O. BOX 15745-00100
NAIROBI

APPLY FUNDAMENTALS OF PROGRAMMING

ISCED UNIT CODE: 0613 554 08A

UNIT CODE: ICT/OS/CS/CR/04/6/MA

UNIT DESCRIPTION

This unit covers the competencies required to understand fundamentals of programming. It involves understanding programming concepts, understanding the Java environment, performing data operations, using control structures, using methods and understanding Object Oriented programming.

ELEMENT These describe the **key outcomes** which make up **workplace function**.	**PERFORMANCE CRITERIA** These are **assessable** statements which specify the required level of performance for each of the elements. ***(Bold and italicized terms are elaborated in the range.)***
1. Identify Programming Concepts	1.1 Programming concepts are applied. 1.2 ***Phases of program development*** are implemented. 1.3 ***Key terms used in programming*** are applied. 1.4 ***Types of code*** are executed. 1.5 Program codes are translated 1.6 Fundamentals of OOP are applied
2. Configure the Java environment	2.1 Java is installed 2.2 Java programming environment is configured. 2.3 Features of Java are implemented. 2.4 Java syntax is analyzed.
3. Perform data operations	3.1 ***Java data types*** are declared. 3.2 ***Types of statements*** are applied 3.3 Variables and constants are declared 3.4 ***Data operations*** are implemented. 3.5 Program to perform specified operations is created.
4. Use Control Structures	4.1 ***Control Structures*** are implemented. 4.2 Uses of different control statements are employed. 4.3 Programs using control statements are created
5. Use methods	5.1 Procedures/Functions/Methods are applied. 5.2 Methods are implemented. 5.3 Programs using methods are developed
6. Perform Object Oriented Programming	6.1 Object oriented programming is applied 6.2 Classes are applied 6.3 Objects are implemented. 6.4 Inheritance is applied

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	6.5 Programs involving Inheritance are developed

RANGE

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

Variable	Range
1. Phases of program development may include but not limited to:	● Establish program requirements ● Design a program ● Coding ● Code test and debug ● Document ● Maintain
2. Key terms used in programming may include but not limited to:	● Algorithm ● Source code ● Executable ● Compiling ● Debugging
3. Types of code may include but not limited to:	● Source code ● Object code ● Machine code
4. Java data types may include but not limited to:	● Integer ● Float ● Strings ● Boolean
5. Types of statements may include but not limited to:	● Declaration ● Executable
6. Data Operations may include but not limited to:	● Number operations ● String operations
7. Control Structures may include but not limited to:	● Decision ● Looping

REQUIRED SKILLS AND KNOWLEDGE

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

Required skills

The individual needs to demonstrate the following skills:

- Communications (verbal and written);
- Time management;
- Problem solving;
- Planning;
- Decision Making;
- Research

Required knowledge

The individual needs to demonstrate knowledge of:

- Programming concepts
- Compiler operations
- The Java environment
- Data Operations
- Control Structures
- Procedures
- Object Oriented Programming

EVIDENCE GUIDE

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

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1. Explained phases of program development 1.2. Installed Java 1.3. Demonstrated understanding of Java environment 1.4. Created a program to perform data operations 1.5. Explained different types of control statements 1.6. Created a program using control statements 1.7. Created a program using methods 1.8. Explained applications of Object Oriented Programming 1.9. Demonstrated classes and objects 1.10. Demonstrated inheritance
2. Resource Implications	The following resources should be provided: 2.1 Access to relevant workplace where assessment can take place 2.2 Appropriately simulated environment where assessment can take place 2.3 Resources relevant to proposed activity or task

3. Methods of Assessment	Competency may be assessed through: 3.1 Oral questioning 3.2 Practical tests 3.3 Observation 3.4 Written test
4. Context of Assessment	Competency may be assessed 4.1 Off the job 4.2 on the job 4.3 During industrial attachment
5. Guidance information for assessment	5.1 Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.