**900220-000-00-KM-01, C++ Basics, NQF Level 4, Credits 2**

**Summative Assessment Memo**

**Module One (1)**

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| **Module Code** | 900220-000-00-KM-01 |
| **NQF Level** | 4 |
| **Credits** | 2 |
| **Skills Programme ID Number** | SP- 230374 |
| **Curriculum Title** | C++ Programmer |
| **Curriculum Code** | 900220-000-00-00 |

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**Note to the learner**

This Learner Guide provides a comprehensive overview of the module. It is designed to improve the skills and knowledge of learners, and thus enabling them to effectively and efficiently complete specific tasks.

**Purpose of the Module**

The main focus of the learning in this knowledge module is to build an understanding of the fundamentals of C++ programming language

The learning will enable learners to demonstrate an understanding of:

* KM-01-KT01: Basic computer knowledge 10%
* KM-01-KT02: Basic Concepts of C++ 15%
* KM-01-KT03: Introduction to suitable IDE (Integrated Development Environment 10%
* KM-01-KT04: GIT and GitHub (Global Information Tracker) 10%
* KM-01-KT05: Problem solving in programming 10%
* KM-01-KT06: Life cycle for developing a solution 10%
* KM-01-KT07: Five Basic Concepts of C++ 10%
* KM-01-KT08: Fundamental concepts in C++ 10%
* KM-01-KT09: C++ syntax 15%

**Provider Accreditation Requirements for the Knowledge Module**

**Physical Requirements:**

* The provider must have lesson plans and structured learning material or provide learners with access to structured learning material that addresses all the topics in all the knowledge modules as well as the applied knowledge in the application.
* QCTO/ MICT SETA requirements

**Human Resource Requirements:**

Lecturer/learner ratio of 1:20 (Maximum)

* Qualification of lecturer (SME): o NQF 5 qualified in industry recognised qualifications with 1-year experience in the IT industry o Cybersecurity vendor certification
* Assessors and moderators: accredited by the MICT SETA

**Legal Requirements:**

* Legal (product) licences to use the software for learning and training
* OHS compliance certificate

**Venue, Date and Time:**

Consult your facilitator should there be any changes to the venue, date and/or time.Refer to your timetable.

**Assessments**

**Integrated Formative Assessment:** The skills development provider will use the curriculum to guide them on the stipulated internal assessment criteria and weighting. They will also apply the scope of practical skills and applied knowledge as stipulated by the internal assessment criteria. This formative assessment leads to entrance into the integrated external summative assessment.

**Integrated Summative Assessment**: An external integrated summative assessment conducted through the relevant QCTO Assessment Quality Partner is required to issue this qualification. The external integrated summative assessment will focus on the exit level outcomes and associated assessment criteria.

**Skills Programme Purpose**

The need for this skills programme was identified after realising the importance and future impact of the 4IR on the economy of South Africa and its competitiveness. The Minister of Communications then gazetted the Presidential Commission on the Fourth Industrial Revolution (PC4IR) on 9 April 2019. In March 2020 this Commission delivered a report with wide ranging recommendations for Human Capital Development that will drive the 4IR forward.

This report clearly indicated the speed at which companies will have to invest in big data analysis, web-enabled market investment and the use of cloud computing and machine learning. Programming skills and being competent in the use of programming languages such as C++ Language are central to these initiatives.

The development of this C++ Programmer Skills Programme is also in support of the drivers for economic recovery as stated in the Economic Reconstruction and Recovery Plan (ERRP) and the subsequent Economic Reconstruction and Recovery Skills Strategy.

**Skills Programme Purpose**

A C++ Programmer will be able to Implement solutions to solve real life problems in an efficient manner applying a knowledge and understanding of the principles of programming with C++ and applicable tools.

Tasks that the learner will be able to know, do and understand after achievement of the skills programme include:

* Create well-written and readable C++ programs, using a disciplined coding style, including documentation and indentation standards.
* Work collaboratively in a team and execute version control

**Entry Requirements**

Grade 11 with Maths Lit and English.

Access to equipment, internet connectivity and how to work remotely

**EXIT LEVEL OUTCOMES**

**Exit Level Outcomes (ELO) 1**

Describe the basics of C++ Programming

Associated Assessment Criteria

* Fundamentals of the C++ programming language are explained.
* Basic concepts and methods of C++ object-oriented programming and object-oriented design are described.
* The development life cycle as a means of creating C++ applications is described.
* A thorough knowledge of the use of algorithms in problem solving is demonstrated.

**Exit Level Outcomes (ELO) 2**

Programme effectively using C++ frameworks and functionalities

Associated Assessment Criteria

* The use of C++syntax is demonstrated by creating neat and concise coding including application of documentation and indentation standards.
* Well-written and readable C++ programs are created, using a disciplined coding style, including comments and indentation standards.
* Procedural and object oriented concepts and syntax are applied.
* The ability to troubleshoot problems with application development is demonstrated and application is debugged.

**Exit Level Outcomes (ELO) 3**

Work collaboratively in a team using the GitHub platform

Associated Assessment Criteria

* An ability to work with Git and GitHub functionalities is demonstrated.
* The ability to work collaboratively in a team using Git is applied
* Version control is executed using Git functionalities such as repositories, branches, commits and pull requests

**Session 1:** **KM-01-KT01: Basic computer knowledge 10%**

1. **IAC0101 Explain the definitions, functions and features of the respective computer elements**

Basic computer knowledge is like the ABCs of the digital world, the foundation upon which you build your tech literacy. Here's a quick rundown:

**Concepts:**

1. **Hardware and Software:** Understand the distinction between the physical components of a computer (hardware) and the programs that run on it (software).
2. **Operating System:** Get acquainted with the OS (Windows, macOS, Linux) that serves as the intermediary between the hardware and the user.
3. **File Management:** Learn to navigate and organize files and folders. This includes tasks like copying, moving, and deleting files.

**Session 2:** **KM-01-KT02: Basic Concepts of C++ 15%**

1. **IAC0201 Explain the concepts, definitions, functions and features of each topic element**

**Concepts:**

1. **Object-Oriented Programming (OOP):**
   * C++ is designed around the principles of OOP, which includes concepts like classes, objects, encapsulation, inheritance, and polymorphism.
2. **Syntax:**
   * C++ syntax is based on the C programming language but with additional features and improvements. It includes elements like variables, data types, loops, conditionals, functions, and more.
3. **Standard Template Library (STL):**
   * C++ provides a powerful set of libraries known as the Standard Template Library, offering reusable templates and algorithms for various data structures and operations.

**Session 3:** **KM-01-KT03: Introduction to suitable IDE (Integrated Development Environment 10%**

1. **IAC0301 State the definitions, functions and features of each topic element**

An integrated development environment (IDE) is a software application that provides comprehensive facilities for software development. An IDE normally consists of at least a source-code editor, build automation tools, and a debugger. Some IDEs, such as NetBeans and Eclipse, contain the necessary compiler, interpreter, or both; others, such as SharpDevelop and Lazarus, do not.

**Session 4:** **KM-01-KT04: GIT and GitHub (Global Information Tracker) 10%**

1. **IAC0401 State the definitions, functions and features of each aspect**

Git is a version control system that manages and keeps track of your code. GitHub, on the other hand, is a service that let you host, share, and manage your code files on the internet.

**Git:**

**Definition:** Git is a distributed version control system (VCS) designed to track changes in source code during software development. It allows multiple developers to collaborate on a project by managing a history of changes, facilitating collaboration, and enabling efficient branching and merging.

**Session 5:** **KM-01-KT05: Problem solving in programming 10%**

1. **IAC0501 Explain the problem solving as a complex and reiterative process**

Thinking like a developer is all about cultivating a problem-solving mindset. Here are some key principles and strategies to help you approach problems like a developer:

**1. Break Down Problems:**

* Developers excel at breaking down complex problems into smaller, more manageable components. When faced with a challenge, try to identify the main components and address them one by one.

**2. Understand the Requirements:**

* Before diving into code, ensure you have a clear understanding of the problem's requirements. What is the desired outcome? What are the constraints? Properly understanding the problem is crucial to finding an effective solution.

**Session 6:** **KM-01-KT06: Life cycle for developing a solution 10%**

1. **IAC0601 Describe the definitions, functions and stages of the programming life cycle**

In systems engineering, information systems and software engineering, the systems development life cycle (SDLC), also referred to as the application development life cycle, is a process for planning, creating, testing, and deploying an information system. The SDLC concept applies to a range of hardware and software configurations, as a system can be composed of hardware only, software only, or a combination of both. There are usually six stages in this cycle: requirement analysis, design, development and testing, implementation, documentation, and evaluation.

**Session 7:** **KM-01-KT07: Five Basic Concepts of C++ 10%**

1. **IAC0701 State the definitions, functions and features of each aspect**

Here are five basic concepts of C++:

**1. Variables and Data Types:**

* **Definition:**
  + Variables are used to store data in a program, and data types define the type of data a variable can hold.
* **Example:**

cppCopy code

int age = 25; // Integer variable double salary = 50000.50; // Double variable char grade = 'A'; // Character variable

**Session 8:** **KM-01-KT08: Fundamental concepts in C++ 10%**

1. **IAC0801 Explain the fundamental concepts in C++**

**Control structures in C++ provide mechanisms for controlling the flow of execution in a program. The primary control structures in C++ include:**

**1. Conditional Statements:**

* **if Statement:**

**cppCopy code**

**if (condition) { // Code executed if the condition is true }**

**Session 9:** **KM-01-KT09: C++ syntax 15%**

1. **IAC0901 Explain the C++ syntax**

Whether you're just starting or want a quick refresher, these concepts are fundamental across various programming languages:

**1. What is Programming?**

* **Definition:**
  + Programming is the process of designing and building an executable computer program to accomplish a specific task. It involves writing instructions that a computer can execute.