**900220-000-00-KM-02, Principles of Programming with C++, NQF Level 4, Credits 6**

**SUMMATIVE ASSESSMENT**

**Module Two (2)**

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| **Module Code** | 900220-000-00-KM-02 |
| **NQF Level** | 4 |
| **Credits** | 6 |
| **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 principles of programming with C++ programming language

The learning will enable learners to demonstrate an understanding of:

* KM-02-KT01:Variables5%
* KM-02-KT02: C++ Strings3%
* KM-02-KT03:Operators3%
* KM-02-KT04: Conditions in C++3%
* KM-02-KT05: Switch statements in C++3%
* KM-02-KT06: Arrays in C++6%
* KM-02-KT07: Loops in C++3%
* KM-02-KT08: References and enumerations in C++3%
* KM-02-KT09: Exception handling in C++3%
* KM-02-KT10: Dynamic Arrays in C++ 3%
* KM-02-KT11: Pointers in C++ 15%
* KM-02-KT12: C++ Char data types 5%
* KM-02-KT13: File handling in C++: Basic input/output 15%
* KM-02-KT14: C++ structure (Struct)3%
* KM-02-KT15: C++ class and object 3%
* KM-02-KT16: C++ operator overloading 3%
* KM-02-KT17: Std: list in C++ 3%
* KM-02-KT18: C++ Functions 5%
* KM-02-KT19: Date/time in C++ 3%
* KM-02-KT20: Debugging in C++ 10%

**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-02-KT01:Variables5%**

1. **IAC0101 State the definitions, functions and features of variables in C++**

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**Session 2:** **KM-02-KT02: C++ Strings3%**

1. **IAC0201 Explain the definitions, functions and features of strings in C++**

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**Session 3:** **KM-02-KT03:Operators3%**

1. **IAC0301 Explain the definitions, functions and features of operators in C++**

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**Session 4:** **KM-02-KT04: Conditions in C++3%**

1. **IAC0401 Explain the definitions, functions and features of conditions in C++**

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**Session 5:** **KM-02-KT05: Switch statements in C++3%**

1. **IAC0501 Explain the definitions, functions and features of switch statements in C++**

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**Session 6:** **KM-02-KT06: Arrays in C++6%**

1. **IAC0601 Explain the definitions, functions and features of Arrays in C++**

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**Session 7:** **KM-02-KT07: Loops in C++3%**

1. **IAC0701 Explain the definitions, functions and features of Arrays in C++**

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**Session 8:** **KM-02-KT08: References and enumerations in C++3%**

1. **IAC0801 Explain the definitions, functions and features of references and enumerations C++**

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**Session 9:** **KM-02-KT09: Exception handling in C++3%**

1. **IAC0901 Explain the definitions, functions and features of exception handling in C++**

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**Session 10:** **KM-02-KT10: Dynamic Arrays in C++ 3%**

1. **IAC1001 Ex[lain the definitions, functions and features of dynamic arrays in C++**

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**Session 11:** **KM-02-KT11: Pointers in C++ 15%**

1. **IAC1101 Explain the definitions, functions and features of pointers C++**

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**Session 12:** **KM-02-KT12: C++ Char data types 5%**

* + 1. **IAC1201 Explain the definitions, functions and features of char data types in C++**

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**Session 13:** **KM-02-KT13: File handling in C++: Basic input/output 15%**

1. **IAC1301 Explain the definitions, functions and features of file handling in C++**

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**Session 14:** **KM-02-KT14: C++ structure (Struct)3%**

1. **IAC1401 Explain the definitions, functions and features of structure (Struct) in C++**

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**Session 15:** **KM-02-KT15: C++ class and object 3%**

1. **IAC1501 Explain the definitions, functions and features of class and object in C++**

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**Session 16:** **KM-02-KT16: C++ operator overloading 3%**

1. **IAC1601 Explain the definitions, functions and features of operator overloading in C++**
2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Session 17:** **KM-02-KT17: Std: list in C++ 3%**

1. **IAC1701 Explain the definitions, functions and features of std::list in C++**

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**Session 18:** **KM-02-KT18: C++ Functions 5%**

1. **IAC1801 Explain the definitions, functions and features of functions in C++**

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**Session 19:** **KM-02-KT19: Date/time in C++ 3%**

1. **IAC1901 Explain the definitions, functions and features of date/time in C++**

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**Session 20:** **KM-02-KT20: Debugging in C++ 10%**

1. **IAC2001 Describe the application of debugging techniques is understood**

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