

Programming 731 (JAVA)

1. Overview

This programme prepares participants to develop object-oriented applications using the Java programming language. Participants explore Java fundamentals, object-oriented programming principles, control structures, data structures including arrays and collections, exception handling, file operations, and multithreading concepts. The programme develops practical skills for Java developers and software engineers creating enterprise-level applications and systems.

2. Learning Outcome:

- Explain the creation and importance of Java and the Java Virtual Machine, identify Java applications and their deployment environments, apply object-oriented programming principles, write basic Java programs using correct syntax, distinguish between primitive data types, create and initialise variables, and apply dynamic initialisation techniques
- Apply arithmetic operators, including basic arithmetic operations, implement relational operators for comparisons, use assignment operators for variable manipulation, and apply control statements for decision-making and program flow control
- Create and manipulate one-dimensional and multidimensional arrays, work with String objects for text manipulation, implement ArrayLists for dynamic data storage, distinguish between arrays and ArrayLists in Java, and iterate through ArrayLists using various techniques
- Define and implement classes as blueprints for objects, declare and instantiate objects from classes, create methods for implementing object behavior, implement constructors for object initialization, apply this keyword for object self-reference, understand garbage collection mechanisms for memory management, apply the static keyword for class-level members, use the final modifier for constants and immutability, and work with advanced array operations
- Implement inheritance for code reusability and hierarchical relationships, apply polymorphism principles for flexible program design, override methods for specialised behaviour in subclasses, implement exception handling mechanisms for error management, and work with Java's built-in exception classes
- Apply exception handling fundamentals including exception types and uncaught exceptions, implement multiple catch statements and nested try blocks for comprehensive error handling, use finally blocks for cleanup operations, apply throws keyword for exception propagation, work with Java's built-in exceptions, implement streams for input and output operations including byte streams and character stream classes, and perform file operations including reading and writing files using byte streams
- Implement multithreading programming for concurrent execution, apply synchronisation techniques to manage shared resources in multithreaded environments, and utilise the Collection Framework and Java.util package for advanced data structure management

Qualification:	Certificate of Competence
Duration:	4-Months
Programme Type:	Category B – Workplace-Based Learning Programme
Programme ID:	PA0661
NQF Level:	7
Credits:	15
Contact Days:	Three (3) facilitated online workshops (recordings available)
Prerequisites:	Grade 12 Qualification or NQF Level 4 equivalent
Training Options:	Online Learning: Please contact our Sales team to confirm the next available intake date for this programme.
Minimum Learner Required:	(1) Online

3. Topics

- Introduction to Java Programming
- Java Platform and Java Virtual Machine (JVM)
- Object-Oriented Programming (OOP) Concepts
- Java Program Structure and Syntax
- Variables, Constants, and Data Types
- Operators and Expressions
- Decision-Making Statements (if, switch)
- Looping Structures (for, while, do-while)
- Arrays and Multidimensional Arrays
- String Handling in Java
- ArrayLists and Collections Framework
- Classes and Objects
- Methods and Method Overloading
- Constructors and Object Initialisation
- The this Keyword
- Static and Final Keywords
- Memory Management and Garbage Collection
- Inheritance
- Polymorphism
- Method Overriding
- Exception Handling (try, catch, finally, throws)
- Built-in Exception Classes
- File Input and Output (I/O)
- Byte Streams and Character Streams
- Reading from and Writing to Files
- Multithreading and Concurrent Programming
- Thread Synchronisation

We trust that the above is in order and look forward to hearing from you for Implementation

- Java Best Practices and Code Optimisation
- Practical Java Application Development
- Debugging, Testing, and Program Maintenance

4. Workplace-Based Learning Programme

This WLP is a fusion of academic learning and practical work. The learning is directly applied to the workplace by using client-based mentors and extensive workplace-based portfolio work and assignments. Apart from the obvious benefits of a workplace directed qualification, each WLP qualifies for recognition as a Category B Skills Programme in the Learning Matrix of the Amended BEE codes, which allows for the salaries of participants to be recognized as part of the Skills Development Expenditure.

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