COMPUTER PROGRAMMING

UNIT CODE: IT/CU/ICT/CR/10/6

Relationship to Occupational Standards
This unit addresses the competency: **Develop computer program**

Duration of Unit: 300 hours

Unit Description:

This unit specifies competencies required to develop computer program. It involves Identifying program and programming concepts, identifying phases of program development, perform program design and Analysis, develop a Computer program, Perform Program testing and debugging, Perform User training and Program Maintenance.

Summary of Learning Outcomes:

1. Identify program and programming concepts
2. Identify Phases of Program development
3. Perform program design and Analysis
4. Develop a Computer program
5. Perform Program testing and debugging
6. Perform User training and Program Maintenance

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Identify program and programming concepts	❑ Definition of program and programming ❑ Programming concepts ✓ Program structure ✓ Variable declaration ✓ Looping structures ✓ Control structures ✓ Syntax ❑ Programming languages ✓ Object oriented ✓ Functional ✓ Imperative ✓ Declarative	• Practical exercises with observation checklist • Oral questioning • Written test • Learner portfolio of evidence.

	❑ Approaches of program development ✓ Waterfall ✓ Agile ✓ Spiral etc	
2. Identify Phases of Program development	❑ Phases of program development ✓ Planning ✓ System analysis and design ✓ System development ✓ Testing ✓ Implementation	• Practical • Project • Observation • Written test
3. Perform program design and Analysis	❑ Definition of program design and analysis ❑ Program design and analysis tools ✓ Dataflow diagram ✓ Pseudocode ✓ HIPO Diagram ✓ Structure charts ❑ Software design levels ✓ High level design ✓ Detailed design ✓ Architectural design ❑ Types of system design ✓ Form design ✓ File organization design ✓ Database design	• Practical exercises • Oral questioning • Written test
4. Develop a Computer program	❑ Format of a computer program ✓ Source code ✓ Components of the program: Program header, declarations, main body ✓ Interrelationships between components ✓ Data structures ❑ Fundamentals of structured programming using C language ✓ Special features ✓ Structure of C language ✓ Variables and constants ✓ Input/output functions ✓ Literal reserved words ✓ Identifiers ✓ Data types and their sizes ✓ Conditional statements	• Practical exercises • Oral questioning • Learner portfolio of evidence.

	✓ Loop control ✓ C functions ✓ Library functions ✓ User defined functions ✓ Arguments and parameters ❑ Fundamentals of Object Oriented programming using Java ✓ Object oriented programming ✓ Java language ✓ Java Virtual Machine ✓ Java Libraries ✓ Program structure ✓ Java Output ✓ Variables and expressions ✓ Classes and objects ✓ Input in java ✓ Data types and operators ✓ Boolean statements ✓ Loops and program flow ✓ Arrays ✓ Exception handling	
5. Perform Program testing and debugging	❑ Difference between testing and debugging. ❑ Types of testing ✓ Smoke ✓ Functional ✓ Usability ✓ Security ✓ Performance ✓ Regression ✓ Compliance ❑ Levels of testing ✓ Unit ✓ Integration ✓ System ✓ Acceptance ❑ Methods of testing ✓ Black box ✓ White box ✓ Gray box ✓ Agile	• Practical exercises • Oral questioning • Written test • Learner portfolio of evidence.

	✓ Adhoc ❑ Debugging steps ❑ Debugging requirements ❑ Debugging principles ❑ Debugging techniques	
6. Perform User training and Program Maintenance	❑ Identification of user training needs ❑ Methods of user training ❑ User training manuals ❑ Maintenance schedule ❑ System maintenance tools and techniques. ❑ Monitoring of system performance ❑ Rectification of bugs ❑ Handling requested changes	•

Suggested Methods of Delivery

- Presentations and practical demonstrations by trainer;
- Guided learner activities and research to develop underpinning knowledge;
- Supervised activities and projects in a workshop;

The delivery may also be supplemented and enhanced by the following, if the opportunity allows:

- Visiting lecturer/trainer from the ICT sector;
- Industrial visits.

Recommended Resources

Tools Comprehensive set of tools. ❑ Flow charts ❑ Data flow diagram ❑ Decision table ❑ Data dictionary ❑ Decision tree
Equipment • Computer • Software

Materials and supplies

Digital instructional material including DVDs and CDs