Republic of Rwanda
Ministry of Education

RTB | RWANDA TVET BOARD

C PROGRAMMING

GENCP401

Apply C Programming

Competence

RQF Level: 4

Learning Hours 80

Credits: 8

Sector: ICT and Multimedia

Trade: Computer System and Architecture

Module Type: General

Curriculum: ICTCSA4001 TVET Certificate IV in Computer System and Architecture

1200

Issue Date: September, 2023

<table>
<tr><td>Purpose statement</td><td colspan="5">This module describes the skills, knowledge and attitude required to apply c programming. This module is intended to prepare students pursuing TVET Level 4 in Computer System and Architecture. The control of these decisions is done through programming of their control parts. At the end of this module, trainees will be equipped with knowledge and skill to Apply Computer programming Languages, Write C Programming codes, Program testing Debugging.</td></tr>
<tr><td rowspan="6">Delivery modality</td><td colspan="2">Training delivery</td><td>100%</td><td>Assessment</td><td>Total 100%</td></tr>
<tr><td colspan="2">Theoretical content</td><td>30%</td><td rowspan="4">Formative assessment</td><td>30%</td><td rowspan="4">50%</td></tr>
<tr><td colspan="2">Practical work:</td><td rowspan="3">70%</td><td>70%</td></tr>
<tr><td>● Group project and presentation</td><td>20%</td></tr>
<tr><td>● Individual project /Work</td><td>50%</td></tr>
<tr><td colspan="2"></td><td colspan="2">Summative Assessment</td><td>50%</td></tr>
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Elements of Competence and Performance Criteria

Elements of competence	Performance criteria
1. Apply Computer programming Languages	1.1. Programming languages are properly identified considering their types and application
	1.2. Algorithm is conveniently developed considering the problem to be solved
	1.3. Flowchart is accurately developed based on the logic of question
2. Write C Programming codes	2.1. C programming building blocks are properly described based on programming standards
	2.2. C program structure is property described according to programming standards
	2.3. Condition statements are effectively applied according to the logic of the problem to be solved.
	2.4. Loops are effectively applied according to the logic of the problem to be solved.
	2.5. Functions are effectively applied according to the logic of the problem to be solved.
	2.6. Arrays are effectively applied according to the logic of the problem to be solved.
	2.7. Problems are correctly solved by using C programming techniques

3. Perform Program Testing	3.1. Different program errors are carefully identified according to the programming standards
	3.2. The program is systematically compiled in accordance with the program instructions.
	3.3. The program is tested and errors are completely corrected based on the program and programming instructions.

Intended Knowledge, Skills and Attitude

Knowledge	Skills	Attitude
✓ Define basic principles of C ✓ Identify various diagnostic tools ✓ Describe IDE	✓ Create a C programs ✓ Compile a C programs ✓ Test a C programs ✓ Debug a C programs ✓ Execute a C programs ✓ Backup and recovery	✓ Creative ✓ Self-driven ✓ Collaborative

Course content

Learning outcomes	**At the end of the module the learner will be able to:** 1. Apply computer programming Languages 2. Write C Programming codes 3. Perform Program Testing

Learning outcome 1: Apply Computer programming Languages	Learning hours: 10
Indicative content	
• **Identification of programming Language** ✓ Types of programming languages ✓ Role of programming languages in electronics and telecommunication ✓ Types of C programming IDE ✓ Setting up C programming environment • **Development of an algorithm** ✓ Types of algorithm ✓ Steps of developing an algorithm • **Development of a flowchart** ✓ Flowchart symbols ✓ Steps of developing a flowchart	
Resources required for the learning outcome	
Equipment	▪ Computers ▪ Projector ▪ Projection screen ▪ Printers
Materials	▪ Chalks ▪ Pens ▪ Papers ▪ Flip-chart ▪ Internet Access
Tools	▪ C programming IDE ▪ Books
Facilitation techniques and	▪ Demonstration and simulation ▪ Individual and group work

learning activities	▪ Practical exercise ▪ Individualized ▪ Trainer guided ▪ Group discussion
Formative assessment methods	▪ Written assessment ▪ Oral presentation ▪ Performance assessment ▪ Product based assessment ▪ Project based assessment

Learning outcome 2: Write C Programming codes	**Learning hours: 60**
Indicative content	

- **Description of C programming concepts**
  - ✓ Tokens in C
  - ✓ Data types
  - ✓ Variables
  - ✓ Constants
  - ✓ Operators
- **Description of C program structure**
  - ✓ Processor Commands
  - ✓ Variables
  - ✓ Functions
  - ✓ Pointers
  - ✓ Statement and Expressions
  - ✓ Comments

- **Application of condition statements**
  - ✓ If
  - ✓ Else if
  - ✓ Switch statement
  - ✓ Nested conditions
- **Application of loops**
  - ✓ For
  - ✓ While
  - ✓ Do while
  - ✓ Nested loops
- **Application of functions**
  - ✓ Types of function
  - ✓ Defining a Function
  - ✓ Function Declarations
  - ✓ Calling a Function
  - ✓ Function Arguments
- **Application of pointers**
  - ✓ Accessing the address of variables
  - ✓ Declaring and initializing of pointers
  - ✓ Accessing a variable through its pointer
- **Application of Arrays**
  - ✓ Types of arrays
  - ✓ Declaring Arrays
  - ✓ Initializing Arrays

Resources required for the learning outcome	
Equipment	▪ Computers ▪ Projector ▪ Projection screen

	▪ Printers
Materials	▪ Chalks ▪ Pens ▪ Papers ▪ Flip-chart ▪ Internet access
Tools	▪ C programming IDE ▪ Books
Facilitation techniques	▪ Demonstration and simulation ▪ Individual and group work ▪ Individualized ▪ Trainer guided ▪ Group discussion
Formative assessment methods	▪ Written assessment ▪ Oral presentation ▪ Performance assessment ▪ Product based assessment ▪ Project based assessment

Learning outcome 3: Perform Program Testing	**Learning hours: 10**
Indicative content	
● **Identification of errors** ✓ Types of errors ✓ Techniques of correcting errors ● **Compilation of the C program** ✓ Types of compilers ✓ Compilation techniques ● **Test of the C program**	

✓ Design of effective test cases ✓ Debugging techniques	
Resources required for the indicative content	
Equipment	▪ Computers ▪ Projector ▪ Projection screen ▪ Printers
Materials	▪ Chalks ▪ Pens ▪ Papers ▪ Flip-chart ▪ Internet access
Tools	▪ C programming IDE ▪ Books
Facilitation techniques	▪ Demonstration and simulation ▪ Individual and group work ▪ Individualized ▪ Trainer guided ▪ Group discussion
Formative assessment methods	▪ Written assessment ▪ Oral presentation ▪ Performance assessment ▪ Product based assessment ▪ Project based assessment

References:

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