10.1.4. STRUCTURED PROGRAMMING (200 HOURS)

10.1.4.01: INTRODUCTION

This module unit is intended to equip the trainee with knowledge and skills to write programs using structured programming languages.

10.1.4.02: General Objectives

By the end of this module unit the trainee should be able to:-

a) understand the program development cycle

b) apply development skills in pascal and c programming languages

c) understand the various data types, control and data structures used in structured computer programs

d) develop a program in a structured programming language

10.1.4.03: COURSE SUMMARY AND TIME ALLOCATION

PASCAL - 100 HOURS
C - 100 HOURS

CODE	TOPIC	SUB-TOPIC	TIME T	TIME P	TOTAL
10.1.4.1	INTRODUCTION TO STRUCTURED PROGRAMMING	• structured programming • types of structured programming languages • history of programming languages • programming paradigms • hardware and software considerations for structured programming	8		8
10.1.4.2	PROGRAM DEVELOPMENT AND DESIGN	• program development and design • program development cycle • structured programming concepts • program design tools	24		24
10.1.4.3	PROGRAM STRUCTURE	• program structure • format of a structured programming language • operators • data types	8		8

CODE	TOPIC	SUB-TOPIC	TIME T	P	TOTAL
10.1.4.4	PROGRAM WRITING	• writing a program in a structured language • handling errors	4	28	32
10.1.4.5	CONTROL STRUCTURES	• control structures • importance of control structures • types of control structures	8	24	32
10.1.4.6	DATA STRUCTURES	• data structures • types of data structures • sort techniques • search techniques	8	32	40
10.1.4.7	SUB-PROGRAMS	• sub-programs • types of sub-programs • scope of variables • parameters	8	24	32
10.1.4.8	FILE HANDLING	• importance of file handling • types of files • file organization techniques • file design • file handling operations	4	8	12
10.1.4.9	PROGRAM DOCUMENTATION	• program documentation • importance of program documentation • types of program documentation • write program documentation	4	4	8
10.1.4.10	EMERGING TRENDS IN PROGRAMMING	• emerging trends in programming • challenges of emerging trends in programming	4		4

10.1.4.1T INTRODUCTION TO STRUCTURED PROGRAMMING

THEORY

10.1.4.1.T0 Specific Objectives

By the end of this topic, the trainee should be able to:

a) explain meaning of structured programming
b) identify different types of structured programming languages
c) explain the historical development of programming languages
d) describe programming paradigms
e) explain computer hardware and software consideration

CONTENT

10.1.4.1.T1 Explaining the meaning of structured programming

- meaning of computer hardware and software
- classification of computer software

10.1.4.1.T2 Identifying different types of structured programming languages

- Pascal
- C
- Fortran
- Cobol
- others

10.1.4.1.T3 History of programming language

- machine language
- low level languages
- high level languages
- fourth generation languages
- fifth generation languages

10.1.4.1.T4 Programming Paradigms

- unstructured programming
- structured programming
- object – oriented programming
- visual programming
- internet based programming

10.1.4.1.T5 Computer hardware and software consideration

- hardware requirements
- appropriate Operating System

10.1.4.2T PROGRAM DEVELOPMENT AND DESIGN

THEORY

10.1.4.2.T0 Specific Objectives

By the end of this topic, the trainee should be able to:-

explain the meaning of program development

explain the meaning of program design

describe programming development cycle

describe structured programming design concepts

describe program design tools

CONTENT

10.1.4.2.T1 Explain the meaning of program development

10.1.4.2.T2 Explain the meaning of program design

10.1.4.2.T3 Describe programming development cycle

10.1.4.2.T4 Describe structured programming design concepts

top-down design

bottom-up design

modular design

control flow structure

monolithic design

10.1.4.2.T5 Describing program design tools

algorithms

flowchart

pseudocode

structured charts

decision tables

10.1.4.3T PROGRAM STRUCTURE

THEORY

10.1.4.3.T0 Specific Objectives

By the end of this topic, the trainee should be able to:-

a) explain the meaning of program structure

b) describe the format of a structured programming language

c) describe common operators

d) describe data types

e) describe identifiers, expressions and I/O instructions

CONTENT

10.1.4.3.T1 Explain the meaning of program structure

10.1.4.3.T2 Describe the format of a structured programming language

10.1.4.3.T3 Describe common operators

operators and order of precedence

operations

10.1.4.3.T4 Describe data types

simple

structured

user defined

10.1.4.3.T5 Describe identifiers, expressions and I/O instructions

10.1.4.4T PROGRAM WRITING

THEORY

10.1.4.4.T0 Specific Objectives

By the end of this topic, the trainee should be able to:-

a) describe the content of a structured program

b) describe the error handling

CONTENT

10.1.4.4.T1 Describing the content of structured programming

10.1.4.4.T2 Describing error handling

PRACTICE

10.1.4.4.P0 Specific Objectives

By the end of this topic, the trainee should be able to:

a) write a program in a structured language

b) handle errors

CONTENT

10.1.4.4.T3 Write a program in a structured language

coding

compiling

debugging

testing

execution and program deployment

10.1.4.4.T4 Errors handling

10.1.4.5T CONTROL STRUCTURES

THEORY

10.1.4.5.T0 Specific Objectives

By the end of the topic, the trainee should be able to:-

a) explain the meaning of control structures

b) describe the importance of control structures

CONTENT

10.1.4.5.T1 Explain the meaning of control structures

10.1.4.5.T2 Importance of control structures

10.1.4.5.T3 Types of control structures

Sequence

Selection

Looping / Iteration

PRACTICE

10.1.4.5.P0 Specific Objectives

By the end of this topic the trainee should be able to:

a) Implement control structures

CONTENT

10.1.4.5.T4 Implementing control structures

10.1.4.6T DATA STRUCTURES

THEORY

10.1.4.6.T0 Specific Objectives

By the end of this topic, the trainee should be able to:-

a) explain the meaning of data structures

b) identify the different types of data structures

c) explain different types of sort techniques

d) explain different types of search techniques

CONTENT

10.1.4.6.T1 Meaning of data structures

10.1.4.6.T2 Types of data structures

- strings
- lists
- arrays
- records
- pointers
- linked lists
- queues
- stack
- trees

10.1.4.6.T3 Sort techniques

- bubble sort
- selection sort
- quick sort
- insertion sort
- merge sort

10.1.4.6.T4 Search techniques

- sequential
- binary
- merge

PRACTICE

10.1.4.6.P0 **Specific Objectives**

By the end of this topic, the trainee should be able to:

a) implement the following
- strings
- lists
- arrays
- records
- pointers
- bubble sort
- sequential search

CONTENT

10.1.4.6.P1 Implement the following

- strings
- lists

arrays
records
pointers
bubble sort
sequential search

10.1.4.7T SUB PROGRAMS

THEORY

10.1.4.7.T0 Specific Objectives

By the end of this topic, the trainee should be able:-

a) define sub-programs
b) identify the different types of sub-programs
c) describe the scope of variables
d) identify and implement Parameters

CONTENT

10.1.4.7.T1 Definition of sub-programs

10.1.4.7.T2 Types of sub-programs

10.1.4.7.T3 Scope of variables

local
global

10.1.4.7.T4 Parameters

meaning of parameters
parameter passing

PRACTICE

10.1.4.7.P0 Specific Objectives

By the end of this topic, the trainee should be able to:-

a) write sub-programs
b) implement parameter passing

CONTENT

10.1.4.7.T5 Writing sub-programs

10.1.4.7.T6 Implementing parameter passing

10.1.4.8T FILE HANDLING

THEORY

10.1.4.8.T0 Specific Objectives

By the end of this topic, the trainee should be able to:-

a) describe of file handling
b) identify the types of files
c) describe file organization techniques
d) explain file design
e) explain file handling operations

CONTENT

10.1.4.8.T1 Importance of file handling

10.1.4.8.T2 Types of files

10.1.4.8.T3 File organization techniques

sequential
random
indexed

10.1.4.8.T4 File design

10.1.4.8.T5 File handling operations

PRACTICE

10.1.4.8.P0 Specific Objectives

By the end of this topic, the trainee should be able to:

a) design organizational file

CONTENT

10.1.4.8.P1 Designing organizational file

10.1.4.9T PROGRAM DOCUMENTATION

THEORY

10.1.4.9.T0 Specific Objectives

By the end of this topic, the trainee should be able to:-

a) explain the meaning of program documentation
b) explain the importance of program documentation
c) describe the types of program documentation
d) write program documentation

CONTENT

10.1.4.9.T1 Define program documentation

10.1.4.9.T2 Importance of programming documentation

10.1.4.9.T3 Types of program documentation

10.1.4.9.T4 Writing program documentation

10.1.4.10T EMERGING TRENDS OF STRUCTURED PROGRAMMING

THEORY

10.1.4.10.T0 Specific Objectives

By the end of this topic, the trainee should be able to:-

a) identify emerging trends in structured programming

b) explain the challenges of emerging trends in structured programming

CONTENT

10.1.4.10.T1 Identifying emerging trends in structured programming

10.1.4.10.T2 Explaining the challenges of emerging trends in structured programming

TEACHING/LEARNING RESOURCES

Relevant text books and free e-books

Sample codes from www

Programming language online help

White board

ASSESSMENT MODE

Written Tests

Practical Tests

Programming Projects