AMEC02 PRINCIPLES OF PROGRAMMING

UNIT-1 LANGUAGES DESIGN ISSUES
1.1 Why Study Programming Languages? A Short History of Programming Languages-

1.2 Development of Early Languages, Evolution of Software Architectures,

1.3 Application Domains, Role of Programming Languages-

1.4 What makes a Good Languages? Language Paradigms; Language Standardization;

1.5 Internationalization, Programming Environments- Effects on Language Design;

1.6 Environment Frameworks; Job Control and Process Languages, C Overview.

UNIT-2 IMPACT OF MACHINE ARCHITECTURES
2.1 Virtual Computers and Language Implementations,

2.2 Hierarchies of Virtual Machines, Binding and Binding Time, Java Overview.

UNIT-3 ELEMENTARY DATA TYPES
3.1 Data Objects; Variables; and Constants, Data types, Declarations,

3.2 Type Checking and Type Conversion, Assignment and Initialization, Numerical Data Types ,

3.3 Enumerations, Booleans, Characters, Character Strings,

3.4 Pointers and Programmer-Constructed Data Objects, Files and Input-Output.

UNIT-4 ENCAPSULATION
4.1 Structured Data Objects and Data Types,

4.2 Specification of Data Structure Types, Implementation of Data Structure Types,

4.3 Declaration and Type Checking for Data Structures, Vectors and Arrays,

4.4 Records, Lists, Sets, Executable Data Objects, Evolution of the Data Type Concept,

4.5 Information Hiding, Subprograms as Abstract Operations,

4.6 Subprogram Definition and Invocation, Subprogram Definitions as Data Objects.

UNIT-5 INHERITANCE
5.1 Abstract Data Types Revisited, Derived Classes, Methods,

5.2 Abstract Classes, Smalltalk Overview, Objects and Messages,

5.3 Abstraction Concepts, Polymorphism.

UNIT-6 SEQUENCE CONTROL
6.1 Implicit and Explicit Sequence Control,

6.2 Sequencing with Arithmetic Expressions

6.3 Tree Structure Representation; Execution-Time Representation,

6.4 Sequence Control between Statements - Basic Statements;

6.5 Structured Sequence Control; Prime Programs.

UNIT-7 SUBPROGRAM CONTROL
7.1 Simple Call-Return Subprograms, Recursive Subprograms,

7.2 The Pascal Forward Declaration, Names and Referencing Environments,

7.3 Static and Dynamic Scope, Block Structure,

7.4 Local Data and Local Referencing Environments, Actual and Formal Parameters,

7.5 Methods for Transmitting Parameters, Transmission Semantics, Implementation of Parameter Transmission.

Reference books:

1. A Formal Semantics of Programming Languages: An Introduction by Glynn Winskel
2. Foundations for Programming Languages by John C Mitchell
3. Programming Languages: Concepts and Constructs by Ravi Sethi