

Elective II- 4 : PRINCIPLES OF PROGRAMMING LANGUAGES

Unit 1

The Study of Programming Languages – Why Study Programming Languages ? – A Short History of Programming Languages – What Makes a Good Language? – Effects of Environments on Languages. Language Design Issues: The Structure and Operation of a Computer – Virtual Computers and Binding Times – Languages Paradigms. Language Translation Issues: Programming Language Syntax – Stages in Translation – Formal Translation Models.

Unit II

Elementary and structured data type: Data object variables, constants, data type, elementary data types, declaration, assignments and initialization, enumeration, characters strings.

Structured data type and objects: Specification of data structured types, vectors and arrays, records, variable size data structure, pointers and programmer constructed data structure, Set files.

Imperative Languages: Block structure, Scope rules, Parameter Passing, Construct like co-routines, Tasks etc.

Unit III:

Object Oriented languages: The class notion- Information hiding and data abstraction using classes, derived classes and inheritance– Polymorphism – Parameterized types.

Unit IV

Functional languages: Functional programming concepts – Referential transparency – Types – Type systems – Names, bindings, environment and scope – Recursive functions – Polymorphic functions – Type variables – High order functions – Curried functions – Lists and programming with lists – Definition of new user defined types in ML – Abstract data types – Evaluation methods.

Unit V

Logic languages: Review of predicate logic – Clause-form logic – Logic as a programming language- Unification algorithm - Abstract interpreter for logic programs – Theory of logic programs – Applications of Logic programming - Introduction to Prolog, Data Structures in Prolog, Programming techniques, Control in Prolog

Text Book

“Programming Languages – Design and Implementation” - by Terrence W. Pratt & Marvin V. Zelkowitz, Fourth Edition

“Programming Languages – Concepts & Constructs” - by Ravi Sethi, Pearson Education.

Reference Books

“Programming Language Design Concepts”– by David A. Watt and William Findlay

“Fundamentals of Programming Languages” – by Ellis Horowitz – Second Edition