

**SUBJECT NO-CS11002, SUBJECT NAME- PROGRAMMING PARADIGMS FOR COMPUTATION  
LTP- 3-1-0,CRD- 4**

**SYLLABUS :-**

Module 1: Introduction: Basics of Machine Models and Data Models. Data Structures and Algorithms. An Introduction to Models of Computation. Computational Modeling of Real-world Phenomena. Computational Simulations and Learning.

Module 2 : Problem Solving and Algorithms: Concept of an Algorithm - Termination and Correctness. Algorithms to Programs - Problem Specification, Decomposition and Refinement. Program Design Issues - Structured Programming, Data and Control Abstractions.

Module 3 : Functional Paradigm: Abstractions with Functions, Designing Functions as Abstractions, Higher-order functions, Recursions and Tree Recursion.

Module 4: Abstractions with Data: Data Abstraction, Sequences, Mutable Data.

Module 5 : Introduction to Algorithmic Complexity: Efficiency Issues in Programming; Time and Space Measures. Illustration with Searching and Sorting Algorithms.

Module 6 : Object Oriented Paradigm: Object Oriented Programming - Classes and Objects. Object Abstraction, Inheritance. Recursive Objects (Linked Lists, Trees, etc.), The Graph Data Model.

Module 7 : Data Representation and Visualization: Working with Experimental Data.

Module 8 : Numerical Computations: Simulations, Interpolations, Optimizations. Solving Various Systems of Equations. Aspects of Error / Accuracy, Convergence, Efficiency, etc.

Module 9 : Introduction to Machine Learning Paradigm: Linear Classification and Regression.

Module 10 : Logic Programming Paradigm: Introduction to Declarative Programs and Logic Programming. Goal / Constraint Satisfaction, Backtracking, Unification.

Module 11 : Advanced Computing Paradigms: Parallel Computing, Quantum Computing.