MIT(CS)-301

Introduction to Computing

Block-1

Unit-1

Introduction to Processes, Procedures and Computers, Measuring Computing Power , Information, Representing Data, Growth of Computing, Science, Engineering, and the Liberal Arts

Unit-2

Introduction to Surface Forms and Meanings, Language Construction, Recursive Transition Networks, Replacement Grammars

Unit-3

Problems with Natural Languages , Programming Languages, Expressions, Primitives, Application Expressions, Definitions of Procedures, Substitution Model of Evaluation, Evaluation Rules

Unit-4

Composing Procedures , Procedures as Inputs and Outputs, Evaluating Recursive Applications ,Developing Complex

Unit-5

datatypes in a program, Pairs, Making Pairs, Triples to Octuples, List Procedures, Procedures that Examine Lists, Generic Accumulators, Procedures that Construct Lists, Data Abstraction

BLOCK -2

Unit-1

History of Computing Machines, Mechanizing Logic, Implementing Logic , Composing Operations, Arithmetic Operation, Modeling Computing ,Turing Machines

Unit-2

Introduction to Empirical Measurements, Orders of Growth, Big O, Omega, Theta, Analyzing Procedures, Input Size, worst Case Input, Growth Rates , Linear Growth, Quadratic Growth, Exponential Growth

Unit-3

Introduction to Sorting, Best-First Sort. Insertion Sort, Quick Sort,

Unit-4

Introduction to Searching algorithm, Unstructured Search , Binary Search, Indexed Search

Block-3

Unit-1

Impact of Mutation, Names, Places, Frames, and Environments Evaluation Rules with State, Mutable Pairs and Lists, Imperative Programming , Imperative Control Structures

Unit-2

Introduction to Packaging Procedures and State, encapsulation, Messages, Object, Inheritance, Implementing Subclasses, Overriding Methods, Object-Oriented Programming

Unit-3

Introduction to Python, Python Programs, Data Types, Control Statements, Parser, Evaluator, If Expressions

Unit-4

Mechanizing Reasoning, Godel's Incompleteness Theorem, The Halting Problem, Proving Non-Computability