***Unit-1 :*** Finite Automata and Regular Expressions: Deterministic and Non-Deterministic Finite Automata, Finite Automata with ε-moves, regular expressions – equivalence of NFA and DFA, two-way finite automata, Moore and Mealy machines, Equivalence of Moore and Mealy machines, applications of finite automata.

***Unit-2 :*** Regular Sets and Context Free Grammars: Properties of regular sets, context-Free Grammars and Languages – derivation trees, Simplification of CFG: Elimination of Useless Symbols, Simplification of CFG: Unit productions, Null productions - Chomsky Normal Forms and Greibach Normal Forms, ambiguous and unambiguous grammars; minimization of finite automata

***Unit-3:*** Pushdown Automata and Parsing Algorithms: Deterministic Push Down Automata – Non-Deterministic Push Down Automata – Equivalence of Pushdown Automata and context-free languages; Properties of CFL; Applications of pumping lemma –– closure properties of CFL and decision algorithms; Overview of Top-down parsing and Bottom-up parsing

***Unit-4 :*** Turing machines: Turing machines (TM) – computable languages and functions – tuning machine constructions – storage in finite control – variations of TMs – Church-Turing thesis – Universal Turing machine– recursive and recursively enumerable languages

***Unit-5:*** Introduction to Computational Complexity: Time and Space complexity of TMs – complexity classes – introduction to NP-Hardness and NP-Completeness Post Correspondence Problems (PCP) – Modified PCP – Halting Problems – Undecidability Problems