



Theory of Automata, Formal Languages and Computation

SWAYAM Prabha Course Code: R18

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| COURSE OUTLINE | <p>Grammars - Production systems - Chomskian Hierarchy - Right linear grammar and Finite state automata - Context free grammars - Normal forms - uvwxy theorem – Parikh mapping - Self embedding property - Subfamilies of CFL - Derivation trees and ambiguity.</p> <p>Finite state Automata - Non deterministic and deterministic FSA, NFSA with ϵ- moves, Regular Expressions - Equivalence of regular expression and FSA.</p> <p>Pumping lemma, closure properties and decidability. Myhill - Nerode theorem and minimization - Finite automata with output.</p> <p>Pushdown automata - Acceptance by empty store and final state - Equivalence between pushdown automata and context-free grammars - Closure properties of CFL - Deterministic pushdown automata.</p> <p>Turing Machines - Techniques for Turing machine construction - Generalized and restricted versions equivalent to the basic model - Godel numbering - Universal Turing Machine - Recursively enumerable sets and recursive sets - Computable functions - time space complexity measures - context sensitive languages and linear bound automata.</p> <p>Decidability; Post's correspondence problem; Rice's theorem; decidability of membership, emptiness and equivalence problems of languages.</p> <p>Time and tape complexity measures of Turing machines; Random access machines; the classes P and NP; NP-Completeness; satisfiability and Cook's theorem; Polynomial reduction and some NP-complete problems.</p> <p>Advanced topics; Regulated rewriting L systems; Grammar systems.</p> <p>New paradigms of computing; DNA computing; Membrane computing.</p> |