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| Hours / Week | : | 4 | |  | Sessional Marks | : | 40 |
| Credits | : | 4 | |  | End Examination Marks | : | 60 |

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| **UNIT – I** |
| **Fundamentals**: Strings, Alphabet, Language, Finite State Machine, Definitions, Finite Automaton model, Acceptance of Strings and languages, Deterministic Finite Automaton and non-deterministic finite automaton.  **Finite Automata**: NFA with epsilon transitions- uses of epsilon transitions, Conversions and Equivalence- Equivalence between NFA with and without epsilon transitions, NFA to DFA conversion.  **Finite Automata With Output**-MOORE and MEALY machines. |
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| **UNIT – II** |
| **Regular Languages**: Regular expressions, Constructing finite Automata for a given regular expressions, Conversion of Finite Automata to Regular expressions, Algebraic Laws for Regular Expressions.  **Properties Of Regular Languages**: Proving languages not to be regular, closure properties of regular languages, Equivalence and Minimization of Automata. |
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| **UNIT – III** |
| **Context Free Grammars And Languages**: Context free grammars, parse trees, Ambiguity in Grammars and languages.  **Properties Of Context Free Languages**: Normal Forms for context free grammars, the pumping lemma for context free languages, closure properties of context free languages |
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| **UNIT – IV** |
| **Push Down Automata**: Definition of Push down automata, Acceptance of CFL- Acceptance by final state and Acceptance by empty stack, Equivalence of CFG and PDA-  From Grammars to PDA, From PDA’s to Grammars, Deterministic PDA. |
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| **UNIT – V** |
| **Turing Machine**: Definition, model, Design of TM, Recursively Enumerable Languages. Church’s hypothesis, counter machine, Types of Turing machines, Universal Turing Machine. Linear bounded automata and context sensitive language, Chomsky hierarchy of languages.  **Undecidability**: A Language that is not Recursively Enumerable, Undecidable problems about Turing Machine, Post’s Correspondence problem, other undecidable problems. |
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| TEXT BOOKS |
| 1. Hopcroft J E, Motwani R And Ullman J D An Introduction To Automata Theory, Languages And Computation 3rd edition, pearson education |
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| REFERENCE BOOKS |
| 1. Azad S K, Theory Of Computation – An Introduction To Automata, Formal Languages And Computability, Dhanpat Rai & co. 2. Cohen D I, An Introduction To Computer Theory, 2nd edition, John Wiley 3. LINZ P, An Introduction To Formal Languages And Automata 2nd edition. 4. Martin J C Introduction to languages and the theory of computation 3rd edition, Tata Mcgraw Hill |