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| 13CS3105 | - | THEORY OF COMPUTATION |

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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
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