



BIT 306

THEORY OF AUTOMATA

UNIT I

Automata: Introduction to finite Automata, Central concepts of Automata Theory.

Finite Automata: An informal picture of finite Automata, Deterministic Finite Automata, Nondeterministic Finite Automata, An Application, Finite Automata with Epsilon Transitions.

Regular Expression And languages: Regular Expressions, Finite Automata and Regular Expression, Applications of Regular Expressions, Algebraic Laws for Regular Expressions.

UNIT II

Properties of Regular Languages: Proving Languages not to be Regular, Closure Properties of Regular Languages, Decision Properties of Regular Languages, Equivalence and Minimization of Automata.

Context Free Grammars and Languages: Context-Free Grammars, Parse Trees, Applications, Ambiguity in Grammars and Languages.

UNIT III

Pushdown Automata: Definition, Language of PDA, Equivalence of PDA's and; CFG's. Deterministic pushdown Automata.

Properties of Context Free Languages: Normal Forms for Context-Free Grammars, Pumping Lemma, Closure Properties, Decision Properties of CFL's.

UNIT IV

Introduction to Turing Machines: Problems that Computer Cannot Solve ,The Turing Machine, Programming Techniques for Turing Machines, Extensions to the Turing Machines, Restricted Turing Machines, Turing Machine and Computers.

UNIT V

Undecidability: A language that is not Recursively Enumerable. An undecidable problem that is RE, undecidable problems about Turing Machines, Post's Correspondence Problem, Other Undecidable Problems.

Intractable Problems: The classes P and NP, An NP complete Problem, A Restricted Satisfiability problem.

Suggested Reading:

1. John E.Hopcroft,Rajeev Motwani,Jeffery D Ulman, Introduction to Automata Theory Languages And Computation, Second edition, Pearson Education, 2007.
2. John C.Martin, Introduction to Languages and The Theory of computation,Third edition, Tata McGraw Hill, 2003.
3. Cohen Daniel I.E, Introduction to Computer Theory, Second edition, 2007.
4. Bemard Moret, The Theory of computation, Pearson Education, 2002.