

SYLLABUS

UNIT I Introduction:

10 Periods

Finite Automata: Need of Automata theory, Central Concepts of Automata Theory, Automation, Finite Automata, Transition Systems, Acceptance of a String, DFA, Design of DFAs, NFA, Design of NFA, Equivalence of DFA and NFA, Conversion of NFA into DFA, Finite Automata with ϵ -Transitions, Minimization of Finite Automata, Finite Automata with output-Mealy and Moore Machines, Applications and Limitation of Finite Automata.

Learning Outcomes: At the end of this unit, the students will be able to

1. Design Finite Automata's for different DFA and NFA
2. Convert NFA to DFA with ϵ -transitions with and without

UNIT II:

10 Periods

Regular Expressions: Classification of grammars, Finite Automata and Regular Expressions, Applications of Regular Expressions, Algebraic Laws for Regular Expressions, Conversion of Finite Automata to Regular Expressions. Pumping Lemma for Regular Languages, Closure Properties of Closure properties of Regular languages

Learning Outcomes:

1. Design Finite Automata's for different Regular Expressions and Languages.
2. Use the Pumping lemma for proving that languages are not regular.

UNIT III:

10 Periods

Formal Languages: Context Free Grammar, Leftmost and Rightmost Derivations, Parse Trees, Ambiguous Grammars, Simplification of Context Free Grammars-Elimination of Useless Symbols, ϵ -Productions and Unit Productions, Normal Forms-Chomsky Normal Form and Greibach Normal Form, Pumping Lemma, Closure Properties, Applications of Context Free Grammars.

Learning Outcomes:

1. To construct context free grammar for various languages.
2. Describe the language accepted by automata or generated by a regular expression or a context-free grammar.

UNIT IV:

10 Periods

Pushdown Automata: Definition, Model, Graphical Notation, Instantaneous Description, Language Acceptance of Pushdown Automata, Design of Pushdown Automata, Deterministic and Non – Deterministic Pushdown Automata, Equivalence of Pushdown Automata and Context Free Grammars, Conversion, Two Stack Pushdown Automata, Application of Pushdown Automata.

Learning Outcomes: At the end of this unit, the students will be able to

1. Analyze the given language is regular or not regular, CFL or not, Ambiguous unambiguous
2. Demonstrate PDA and NPDA machines.

UNIT V:**10 Periods**

Turing Machine: Definition, Model, Representation of TMs-Instantaneous Descriptions, Transition Tables and Transition Diagrams, Language of a TM, Design of TMs, Types of TMs, Church's Thesis, Universal and Restricted TM, Decidable and Un-decidable Problems, Halting Problem of TMs.

Learning Outcomes:

1. Design Turing Machine for halting problems
2. Able to distinguish between decidability and Undecidability.

Text Book:

1. Introduction to Automata Theory, Languages and Computation, J. E. Hopcroft, R. Motwani and J D. Ullman, 3rd Edition, Pearson, 2008

Reference Book:

1. Formal Language and Automata Theory, K. V. N. Sunitha, N. Kalyani, 2nd Edition, Pearson Education, 2015

Web Resources:

1. <https://nptel.ac.in/courses/106/104/106104028/>
2. <https://www.udemy.com/learnanything/anytimeanywhere>