Formal Languages & Automata Theory

PREREQUISITIES: Data Structure and Programming Methodology

Source	Topic
Chapter 1 (Mathematical Preliminaries)	1. Sets, Relations and Functions 2. Graphs and Trees 3. Strings and Their Properties 4. Examples
Chapter 2 (Theory of Automata)	1. Defintion of Automaton 2. Description of a finite Automaton 3. Transition system 4. Properties of Transition Functions 5. Acceptabiltiy of a string by a Finite Automaton 6. Nondeterministic Finite State Machines 7. Equivalence of DFA and NDFA 8. Minimization of Finite Automaton
Chapter 3 (Formal Languages)	1. Basic Definitions and Examples 2. Chomsky hierarchy of languages 3. Recursive and Recursively Enumerable Sets 4. Opeartions on Languages 5. Languages and Automaton
Chapter 4 (Regular Languages)	1. Regular Expressions 2. Finite Automaton and Regular Expressions 3. Pumping lemma of regular sets 4. Closure properties of regular sets 5. Regular sets and Regular Grammar
Chapter 5 (Context- free Languages)	1. Context free Languages and derivation Trees 2. Ambiguity in context free grammars 3. Minimization of Context Free Grammars 4. Chomsky normal form 5. Greiback normal form 6. Pumping Lemma for Context Free Languages
Chapter 6 (Push Down Automata)	1. Definition 2. Acceptance of CFL 3. Acceptance by final state and acceptance by empty state and its equivalence 4. Equivalence of CFL and PDA
Chapter 7 (Turing Machine)	1. Definition 2. Design of TM

	3. Universal Turing Machine 4. Linear bounded automata and context sensitive language 5. Halting problem of Turing machine
Chapter 8 (Computability Theory)	1. Introduction and Basic concepts 2. Definition of P and NP problems 3. NP complete and NP hard problems 4. Correspondence problem 5. Decidability of problems