Formal Language & Automata Theory
Code: CS 512
Credits: 4

Finite State Machines
Definition, concept of sequential circuits, state table & state assignments, concept of synchronous, asynchronous and liner sequential machines

Finite State Models
Basic definition, mathematical representation, Moore versus Mealy m/c, capability & limitations of FSM, state equivalence & minimization, machine equivalence, incompletely specified machines, merger graph & compatibility graph, merger table, Finite memory, definite, information lossless & inverse machines : testing table & testing graph.

Structure of Sequential Machines
Concept of partitions, closed partitions, lattice of closed partitions, decomposition : serial & parallel.

Finite Automation
Preliminaries (strings, alphabets & languages, graphs & trees, set & relations), definition, recognition of a language by an automata - idea of grammar, DFA, NFA, equivalence of DFA and NFA, NFA with e-moves, regular sets & regular expressions : equivalence with finite automata, NFA from regular expressions, regular expressions from DFA, two way finite automata equivalence with one way, equivalence of Moore & Mealy machines, applications of finite automata.

Closure Properties of Regular Sets
Pumping lemma & its application, closure properties minimization of finite automata : minimization by distinguishable pair, Myhill-nerode theorem.

Context Free Grammars
Introduction, definition, derivation trees, simplification, CNF & GNF.

Pushdown Automata
Definition, moves, instantaneous descriptions, language recognised by PDA, deterministic PDA, acceptance by final state & empty stack, equivalence of PDA and CFL.

Closure Properties of CFLs
Pumping lemma & its applications, ogden's lemma, closure properties, decision algorithms.

Introduction to ZRL & CSL
Introduction to Z. Regular language properties and their grammars, Context sensitive languages.